HYBRID LEARNING LANDSCAPE FRAMEWORK:
holistic high performance schools for comprehensive learning and play

by

JAIME VICKREY
B.S, University of Missouri-Columbia, 2008

A REPORT

submitted in partial fulfillment of the requirements for the degree

MASTER OF LANDSCAPE ARCHITECTURE

Department of Landscape Architecture, Regional and Community Planning
College of Architecture, Planning and Design

KANSAS STATE UNIVERSITY
Manhattan, Kansas

2011

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May 2011

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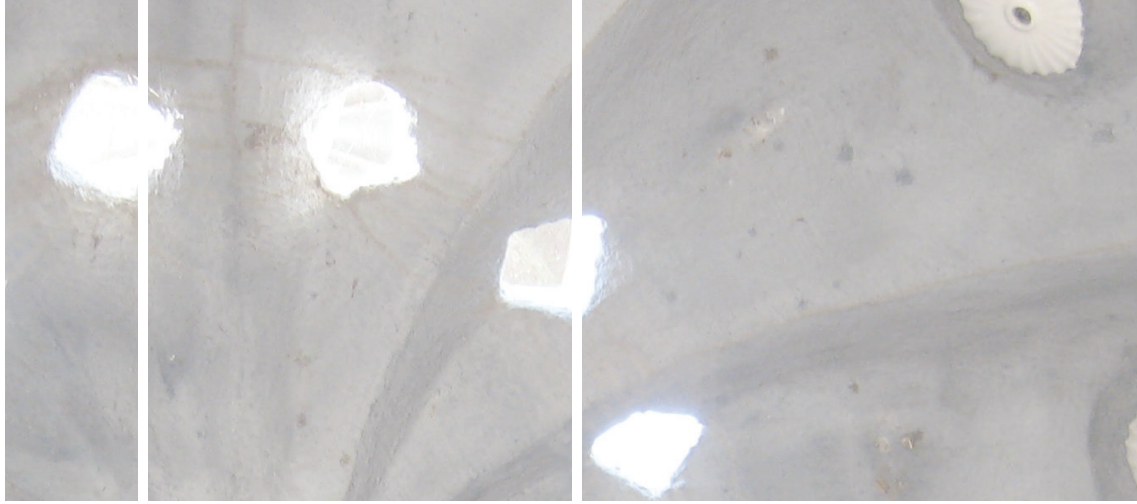
Abstract

School environments of today's urban children are generally inflexible, restricting and uninspiring places for learning and exploration that are disconnected from their surrounding community and nature. Facilities and teaching methods do not keep pace with the evolving needs of the workforce and varying child learning styles (Stanbury 2009). Organized sports, limited free time and standardized testing steal the zest out of childhood discovery once felt by children who grew up with a connection to their surroundings, especially nature. Many adverse effects are seen as a result. "Nature-deficit disorder describes the human costs of alienation from nature, among them: diminished use of the senses, attention difficulties and higher rates of physical and emotional illnesses," (Louv 2008, 36). Children are left to face the world's escalating environmental dilemmas with hindered social and cognitive skills, diseases related to association and disassociation from nature and an impaired relationship with their extended community.

Programs like University Colorado Denver's Learning Landscapes and California's Collaborative for High Performance Schools (CHPS) and have individually worked to improve learning facilities, reconnect students with outdoor curriculum-based learning and establish a bond with their communities. But implemented designs reveal unmet potential, calling for advancement and further evolution of the school learning environment.

MontClair Elementary in Oakland, California is a typical urban school with paved schoolyard, restricted boundary, weak link between curriculum and schoolyard, disconnect from the community and disassociation from nature. New CHPS verified facilities are being implemented on their existing campus to accommodate an increase in student population but the link between schoolyard and curriculum has only been minimally addressed in the proposed design.

Integrating Learning Landscapes with the Collaborative for High Performance Schools to create a hybrid learning landscape framework will reconnect MontClair Elementary with the surrounding community and nature. Advancement of the CHPS program, through adaptation of their existing scorecard, will allow Hybrid Learning Landscape Framework to be quantitatively applied to MontClair Elementary.



hybrid learning | landscape | framework

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Acknowledgements

To my family, especially mom and dad, for understanding why I cannot make it home as often as I would like, for encouraging me to always strive for more and teaching me to never give up.

To my studio friends, especially Heather, for making it fun and joining me for many ‘necessary’ trips to the Union and Aggieville.

To the CAPD faculty for your long hours and dedication to us students, especially Katie Kingery-Page for introducing new perspectives, keeping me on track and helping me find inspiration in unexpected places.

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abstract

According to Cayuga Bear Clan Mother Carol Jacobs, "We call the future generations 'the coming faces.' We are told that we can see the faces of children to come in the rain that is falling, and that we must tread lightly on the earth, for we are walking on the faces of our children yet to come," (OWP/P Architects, et al. 2010, 139).

School environments of today's urban children are generally inflexible, restricting and uninspiring places for learning and exploration that are disconnected from their surrounding community and nature. Facilities and teaching methods do not keep pace with the evolving needs of the workforce and varying child learning styles (Stanbury 2009). Organized sports, limited free time and standardized testing steal the zest out of childhood discovery once felt by children who grew up with a connection to their surroundings, especially nature. Many adverse effects are seen as a result. "Nature-deficit disorder describes the human costs of alienation from nature, among them: diminished use of the senses, attention difficulties and higher rates of physical and emotional illnesses," (Louv 2008, 36). Children are left to face the world's escalating environmental dilemmas with hindered social and cognitive skills, diseases related to association and disassociation from nature and an impaired relationship with their extended community.

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contents

"Intellectual discovery," according to Ralph Edison, "is a means to freedom," (OWP/P Architects, et al. 2010, 131).

list of figures + tables

"Paying attention is easier when you're actually doing something, rather than only considering how it might be done," (Louv 2008, 79).

Figures

Tables

01 theoretical position

Figure 1.01
Walking the Turtle
Maule, Michele. *Walking the turtle*. February 4, 2011. http://landscapeandurbanism.blogspot.com/2011/02/walking-turtle.html.

2

theoretical position

"To the degree that everyday inhabitants experience landscape, they do so in a general state of distraction, and more through habit and use than through vision alone," (Corner 1999, 154).

American Landscape

American landscape is the result of a long and complex history embedded within the changing cultural dynamics of its people (Cosgrove 1984). Since the beginning of European settlement the concept of ownership and parceling has been inflicted on the land. Within the physical bounds of site, owners were free to re-purpose the land according to their own discretion. By the late 20th and early 21st century the landscape had evolved into a meshwork of isolated and fragmented sites that suffered from placelessness and ecological dysfunction, denying people a deeper understanding and relationship with the natural world. "Landscape is a social and cultural product, a way of seeing projected on to land and having its own techniques and compositional forms; a restrictive way of seeing that diminishes alternative modes of experiencing our relations with nature," (Cosgrove 1984, 269).

The resulting landscapes serve either instrumental or representational purpose; rarely a combination of the two. Instrumental landscapes are geared towards production and reveal how systems work, interact and evolve over time but lack the

aesthetic qualities that invoke care upon the landscape (Corner 1999). Representational landscapes are purely aesthetic and tend to mask realistic functions in order to entertain idealistic visions and bias of their owner or designer (Corner 1999). Both instrumental and representational landscapes fail to reveal the effect people have on the environment and contribute to the broken dialogue between people and nature.

Where is LEED Leading Us?

The effects of our disassociation with nature are slowly but steadily being revealed, resulting in an evolutionary collapse [or revolt] of the natural world most recognized through Global Climate Change. Sustainability has been presented as the solution but what does it really mean and where is it leading us?

The term sustainable development, traced back to 1983, is defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs (United Nations 2007). Various adaptations and interpretations have since evolved, resulting in a term that means everything and nothing, depending on who you ask. To sustain suggests the ability to withstand or provide basic necessities in order to survive (Encarta Dictionary 2009). Should we not aim for more? "If someone was asked to describe their marriage and they responded, "sustainable," I would feel sorry for them," Michael Braungart (Tobias 2010).

Efforts have been made to inform and encourage sustainable practices in civic and design society in order to minimize the negative impact humans have on the earth. In the civic realm, clichés like Going Green or being Environmentally Friendly are presented in media through trendy advertisements geared towards selling products. Marketing sustainability addresses people as consumers and not as citizens resulting in disconnect between social trend and cultural adaptation. Design professions have established point based recognitions systems like Leaders in Energy and Environmental Design (LEED), Sustainable Sites Initiative (SSI) and Collaborative for High Performance Schools (CHPS) that praise sustainable development practices but fail to address the element of time and change through long-term evaluation. Certification systems move the industry forward but also hold it back by associating maxed out scorecards with ultimate performance buildings.

The true test of performance is revealed in time which is not on the checklist. What would we be accomplishing if every building and landscape were certified? In ten or even twenty years the same buildings or landscapes would likely not meet the needs of that generation. We cannot meet the needs of tomorrow by achieving standards set by today. Instead of reaching for the societal gold star through different certification organizations that focus on the end product, the focus should be on performance. Landscapes that perform do so socially, culturally and environmentally, constantly adapting resulting in resilient landscapes. “Resilience is the ability of a system to adapt and adjust to changing internal or external processes” (Hill 2005, 143).

Figure 1.01
Walking the Turtle
Maule, Michele. *Walking the turtle*. February 4, 2011. http://landscapeandurbanism.blogspot.com/2011/02/walking-turtle.html.

Opportunities in Landscape

Landscape architecture has a significant opportunity to be redefined as a culturally relevant profession capable of reorienting culture towards environmental resiliency. Until now landscape architecture has been tossed around as the ‘jack of all trades’ in the design professions- faulted for knowing an average amount of everything but lacking depth in one specific field. Landscape architects are the visionaries that can mediate between design disciplines through intellectual understanding and reciprocation, capable of imagining and implementing design solutions that effectively link function with aesthetics in creative and provocative ways. “The future of landscape as a culturally significant practice is dependent on the capacity of its inventors to image the world in new ways and to body forth those images in richly phenomenal and efficacious terms,” (Corner 1999, 167).

Design professionals seem to have a grasp on the implications surrounding global climate change and environmental resiliency, for they have the educational background and interest imbedded within them. They are able to predict the long-term environmental results of society's actions based on objective perspective. But, how does landscape architecture reach the everyday insider who experiences landscape in a general state of distraction, going about their daily habits and routines, rather than through vision alone (Corner 1999)? The answer lies in shifting a society of insiders from "ego-centric to bio-centric perspectives" through their everyday experiences in landscape (Meyer 2008, 6). Figure one metaphorically represents the pace of a turtle and symbolizes the idea that intentional design can control the pace and direction of people, affecting their experiences. "Design cannot change society, it can however alter an individual's consciousness and perhaps assist in restructuring her priorities and values," (Meyer 2008, 10).

The principles of environmental resiliency can be introduced to society through hybrid environments that engage multiple systems. Chris Reed of Stoss Landscape Urbanism describes these environments as "hybrid ecologies". "Hybrid ecologies refers to the development of responsive design systems that tap into environmental, engineering and social dynamics simultaneously- systems that engage both human and nonhuman dynamics and forces," (Mostafavi and Doherty 2010, 328). The collective awareness and increased dialogue among members of society and between society and nature will further advance culture towards environmental resilience- a future we cannot now imagine (Berrizbeitia 2001). Hybrid ecologies in landscape link representation and instrumentation to blend cultural aesthetics with ecological processes that open social convention to critique, reflection and alternative possibilities (Corner 1999, 164).
Hybrid ecologies can be implemented in any environment, but they would most effectively be utilized in an environment where creativity flourishes, ideas are forming and learning is active. Schools idealistically encompass these characteristics and inherently play a large part in shaping the culture and minds of the next generation.

02 project introduction

Figure 2.01
The Next Generation
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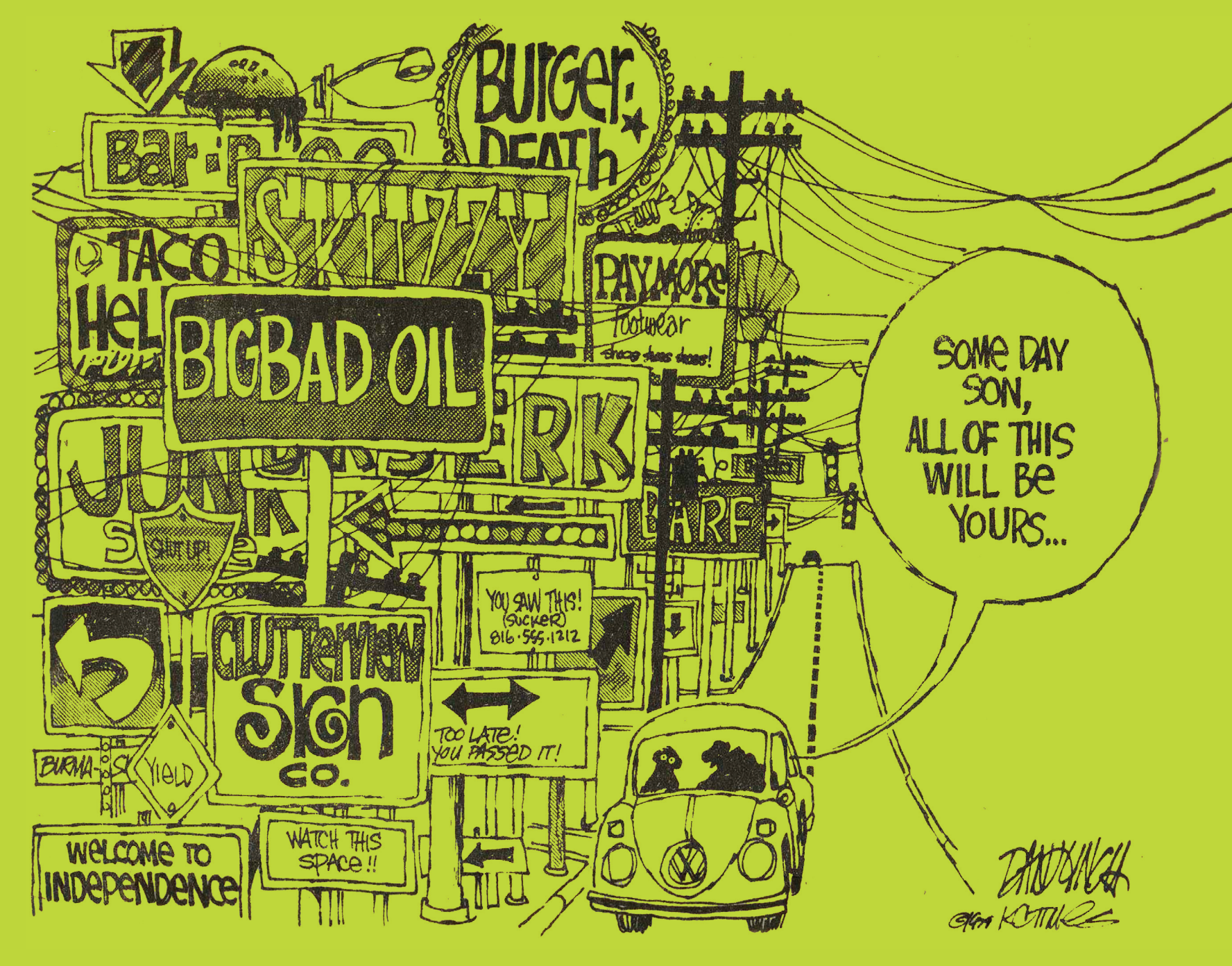
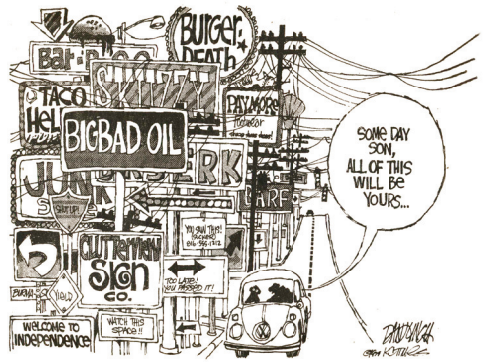

BURGER DEATH
Bar
SKUZZY
TACO
HELL
PAYMORE
Footwear
BIGBAD OIL
JUNK
LARF
SHUT UP!
YOU SAW THIS! (SUCKER) 816·555·1212
CLUTTERMAN SIGN CO.
TOO LATE! YOU PASSED IT!
BURMA-SHAVE
YIELD
WELCOME TO INDEPENDENCE
WATCH THIS SPACE!!
SOME DAY SON, ALL OF THIS WILL BE YOURS...

dilemma

"All education is environmental education quoted David Orr. By what is included or excluded we teach students that they are part of or apart from the natural world," (OWP/P Architects, et al. 2010, 137).

Although school environments are designated as places for children to learn, play and grow many of today's learning environments actually inhibit children from learning, restrict play and hold children back from reaching their full potential. Students learn in the same non-flexible facilities and from curriculum and lesson plans that generations before them were taught, not keeping up with evolving culture and workforce. "Cisco, Microsoft, and Intel concluded that most education systems have not kept pace with the dramatic changes in the economy and the skill sets that are required for students to succeed: the ability to think critically and creatively, to work cooperatively, and to adapt to the evolving use of information and communications technology in business and society," (Stanbury 2009). Teachers address one learning style (visual and hearing) although there are many, making it difficult for some students to keep up while holding others back. Since the 'No Child Left Behind Act' of 2002 teachers have also been forced to 'teach tests' in order for their students to score high on standardized testing, which guides allocation of funding by the government, producing students who can recite information but cannot apply it in real life situations. The tests are multiple choice and do not reflect depth of understanding, meaningful application of knowledge or original thinking (Olfman 2005).

Figure 2.01
The Next Generation
Source unknown.



Children are generally disassociated from nature and their community, especially in urban locations. They often do not know where their food comes from. They eat packaged food at lunchtime and the majority of them eat fast food for dinner. Free time is spent watching television,

SOME DAY SON, ALL OF THIS WILL BE YOURS...

playing video games, participating in organized sports, playing on prefabricated equipment and on paved open spaces that are fenced off from nature and the surrounding neighborhood. Children are increasingly unable to collaborate and problem solve effectively due to lack of social interaction. Childhood depression, anxiety, attention disorders and weak cognitive development are directly related to a child's disassociation from nature, referred to as Nature Deficit Disorder. "Nature-deficit Disorder describes the human cost of alienation from nature, among them diminshed use of the senses, attention difficulties and higher rates of physical and emotional illness," (Louv 2008, 36). Although children are separated from nature, they still suffer from diseases associated with its decline like asthma, obesity and diabetes (Stone and Barlow 2009).

Programs like the Collaborative for High Performance Schools (CHPS) and Learning Landscapes have worked to improve the school learning environment by linking outdoor environments with curriculum, improving indoor learning facilities and introducing links to the community. But, there is still unrealized potential for high performance schools that are aimed towards environmental resiliency.

MontClair Elementary in Oakland, California is a typical urban school that suffers from declining budget, limited open space, increased student population and general disconnect between children and nature. Because of a large grant awarded by Oakland Unified School District, they have been able to plan for new classroom facilities based on the Collaborative for High Performance Schools Organization which focuses on high performance learning environments. The proposed CHPS verified site plan is very effective at increasing indoor high performance spaces but fails to capitalize on the potential for a complimentary high performance, outdoor learning environment.

thesis

Chiefs of the Iriquois Confederacy are expected to consider three things when making law: the effect of their decision on peace, the effect on the natural world and the effect on seven generations in the future (OWP/P Architects, et al. 2010).

Integrating Learning Landscapes with the Collaborative for High Performance Schools to create Hybrid Learning Landscape Framework will create a holistic high performance school system that utilizes the interior and exterior school environment for comprehensive learning and play. Advancement of the CHPS program, through adaptation of their existing scorecard, will allow Hybrid Learning Landscape Framework to be quantitatively applied to MontClair Elementary.

03

forming hybrid learning landscape framework

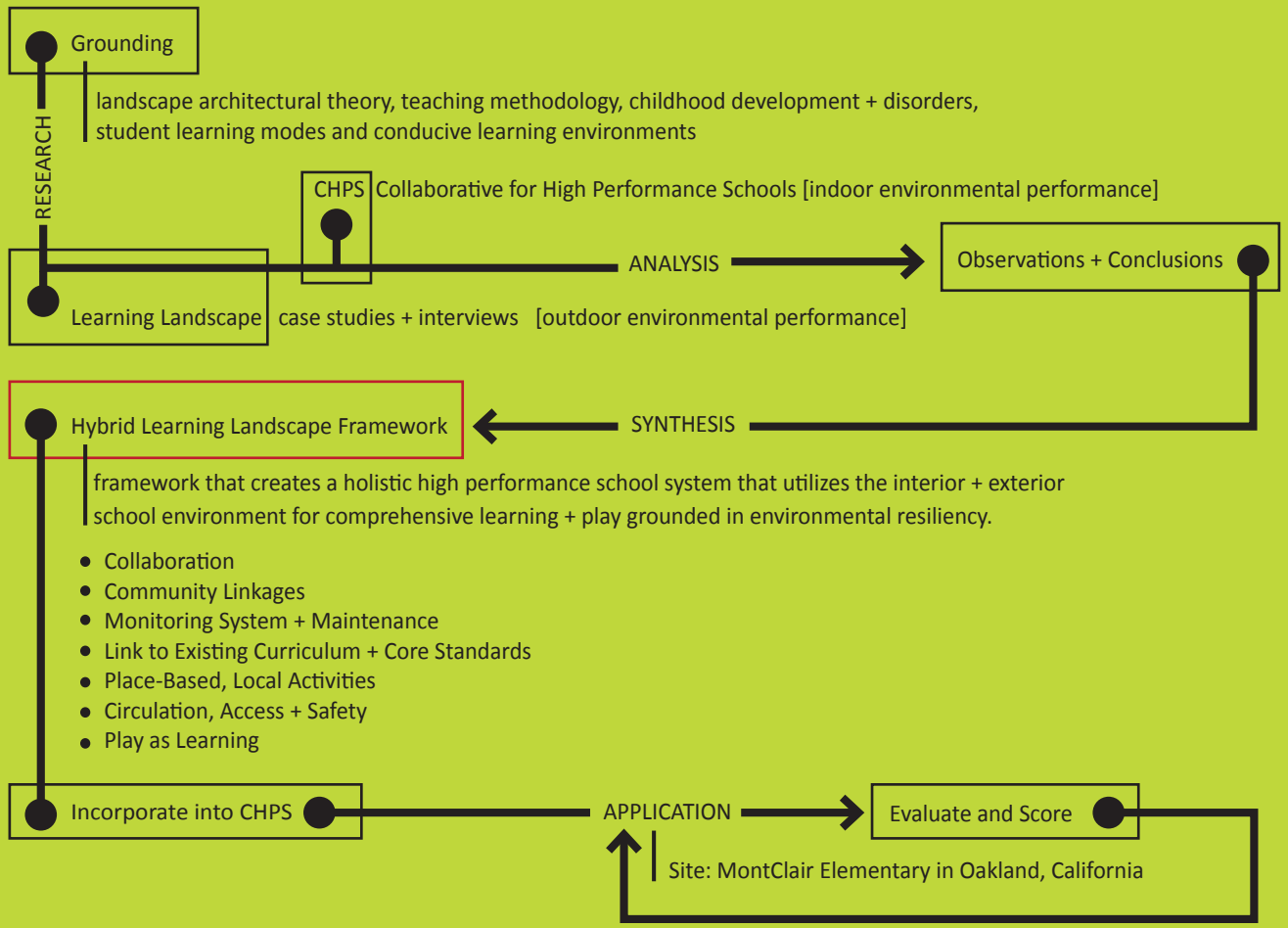


Figure 3.01
Forming Hybrid Learning Landscape Framework
By Author 2011

forming the framework

"What is important [in this view] is how creative practices of ecology and landscape architecture enable alternative forms of relationship and hybridization between people, place, material and Earth," (Corner 1997, 105).

Hybrid Learning Landscape Framework* was formed under the overarching goal of environmental resilience through research, analysis and synthesis and was then applied to the site of MontClair Elementary in Oakland, California. Research was grounded in architectural theory, teaching methodology, childhood disorders and diseases, student learning modes and conducive learning environments. Cumulative research served as the lens for analyzing Learning Landscape case studies and interviews, and the Collaborative for High Performance Schools Program. Through research and analysis, key components for environmental resilience that can be addressed by schools become the basis for Hybrid Learning Landscape Framework. Hybrid Learning Landscape Framework is comprised of principles of collaboration, community linkages, system monitoring and maintenance, schoolyard link to curriculum and core standards, place-based local activities, circulation, access, safety and play as learning. Advancement of the CHPS program, through adaptation of their existing scorecard rating system, allowed Hybrid Learning Landscape Framework to be quantitatively applied to MontClair Elementary (refer to Figure 3.01).

*Hybrid Learning Landscape Framework is a framework that creates a holistic high performance school system that utilizes the interior and exterior school environment for comprehensive learning and play grounded in environmental resiliency.

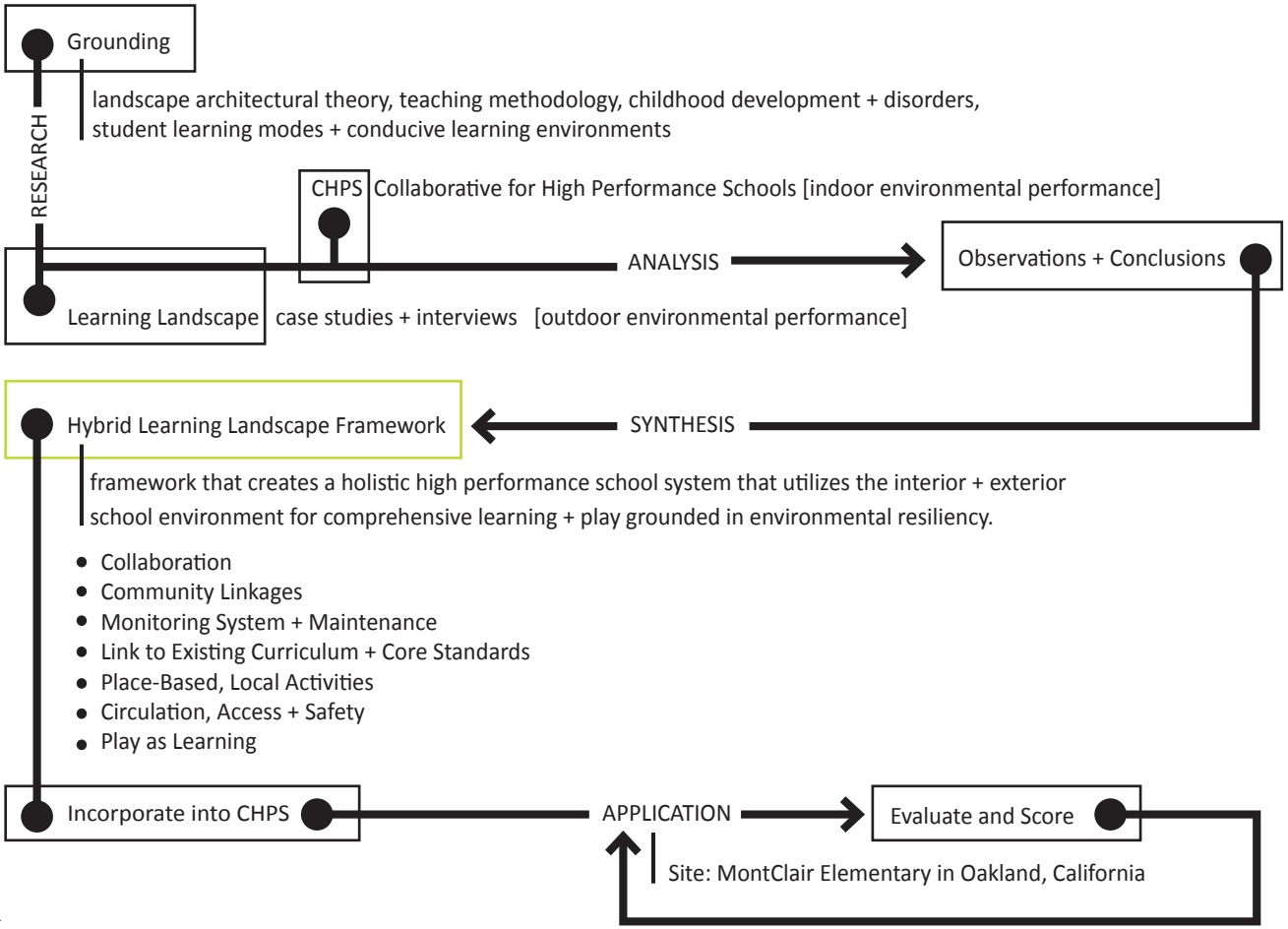


Figure 3.01
Forming Hybrid Learning Landscape Framework
By Author 2011

research + analysis

"As new paradigms develop and preconceived boundaries dissolve, fields such as design and science may find themselves in an altered relationship, making this a critical time for those fields to take a fresh look at each other," (Hill 2005, 6).

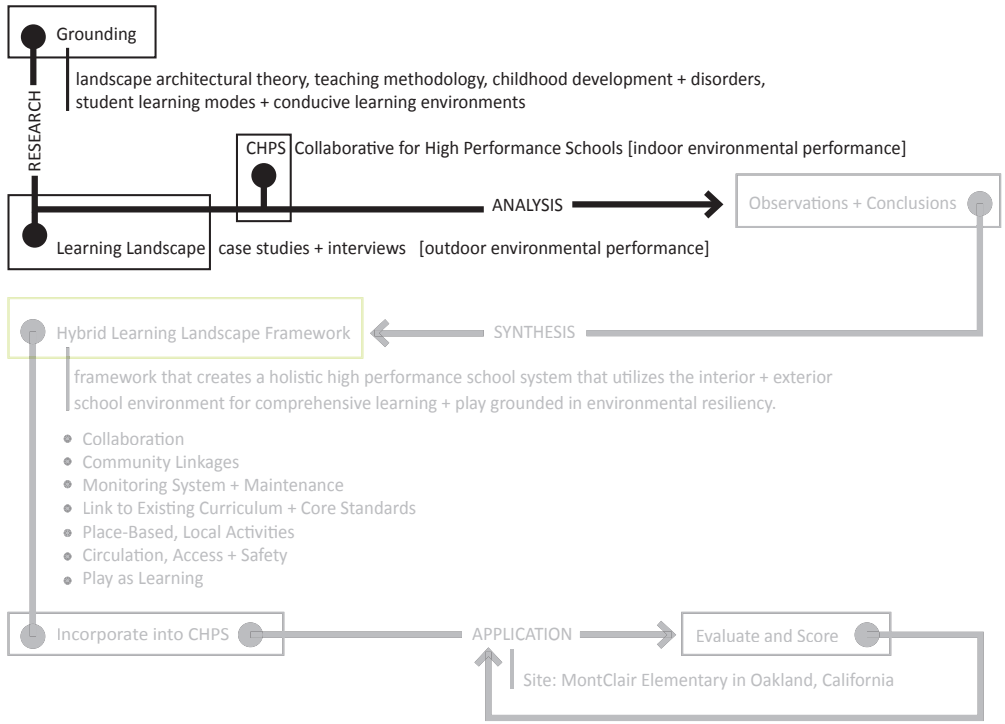


Figure 3.01
Forming Hybrid Learning Landscape Framework
By Author 2011

Hybrid Learning Landscape Framework is grounded in research on landscape architectural theory, teaching methodology, childhood disorders and diseaess, student learning modes and conducive student learning environments. Refer to Appendix e, page 106, for key literature reviews. Learning Landscapes and CHPS were then researched and analyzed to draw conclusions and build the basis for Hybrid Learning Landscape Framework.

Learning Landscapes

Definition

Learning Landscapes is a nationally recognized organization created from a partnership between Denver Public Schools and University Colorado Denver. The organization is dedicated to designing outdoor student learning environments that serve the school and community as a curriculum based learning tool, playground, social gathering area and park (adapted from Brink and Yost 2004). The organization targets urban schools with large amounts of asphalt, gravel and little green space. Each project aims to incorporate the organization's four main goals.

Learning Landscape Goals

- Incorporate existing curriculum into landscape in ways that are interactive, easily adapted and usable by instructors, community members and students (adapted from Brink and Yost 2004).

- Encourage formation of learning landscape team composed of school staff, students and community members to ensure longevity and success over time through maintenance and ongoing support (adapted from Brink and Yost 2004, Townley 2008).

- Include community members, students, teachers, maintenance staff and professionals in design phases, outdoor art projects, and planting of Learning Landscape to reconnect community and promote ownership (adapted from Townley 2008).

- Create a multi-generational, flexible space that can be used as a public park for social gathering, recreation and play to ensure the space's long-term cultural and social relevance (adapted from Brink and Yost 2004).

Representative Case Studies

Two case studies, Steele Elementary and Edison Elementary, were chosen based on availability of a representative willing to speak about their learning landscape, links to learning landscape objectives, scale of site and student population similarities with my project site: MontClair Elementary. The purpose of each case study was to inventory and analyze the school's land use, program elements, goals, background, demographics, context, design intent, schoolyard link to curriculum, funding, maintenance and other aspects through inventory and survey analysis in order to make observations about effective and ineffective learning environments planned through Learning Landscapes. The results and conclusions aided in forming Hybrid Learning Landscape Framework. Refer to Appendix c, page 91, for case study inventory and Appedix d, page 96, for case study survey analysis.

General Observations and Conclusions

Learning Landscapes are greatly improved schoolyards compared to the asphalt and gravel fields that proceeded them. They begin to address the link between curriculum and landscape, significantly increase the accessible green space and improve interactive spaces. But, there is potential for Learning Landscapes to have a greater link to curriculum, nature and community interaction.

The Collaborative for High Performance Schools

Definition

Collaborative for High Performance Schools was initiated in 2001. It is a growing, nationally recognized, California based organization dedicated to a building a new generation of high performance schools that focus on the financial, health and student performance of schools. Their scorecard based system rates schools on seven performance categories applicable to three development types: new schools, new buildings on an existing campus and major modernizations. Schools sign up before design begins, policy is adopted, their program is evaluated and designed, the project is built then the built work is double checked for fulfillment of the performance categories (refer to Figure 3.02). Currently, there are 66 credits, 11 prerequisites and 118 total possible points (adapted from CHPS 2007, Geers and Dekovic 2009). Refer to Appendix f, page 114, for full review of the existing scorecard rating system.

CHPS Performance Categories

Energy and water efficiency
Sustainable sites
Stormwater management
Acoustics
Indoor air quality
Waste management

Benefits of a High Performance School

- Heightened student performance
- Reduced operating costs
- Better student and teacher health
- Increased average daily attendance of teachers and students
- Improved teacher satisfaction and retention
- Reduced liability exposure
- Reduced indoor & outdoor environmental impact
- Eligible for financial incentives (Geers and Dekovic 2009)

General Observations and Conclusions

Although there is significant improvement to the indoor quality of student learning environments, the opportunities for outdoor learning and community interactions are overlooked through the CHPS Program. Steps are made to address principles of environmental resiliency but greater links could be made.

Figure 3.02
CHPS Application Process
CHPS 2007

observations + conclusions

"There is no end, no grand scheme for these agents of change, just a cumulative directionality toward further becoming," (Corner 1997, 81).

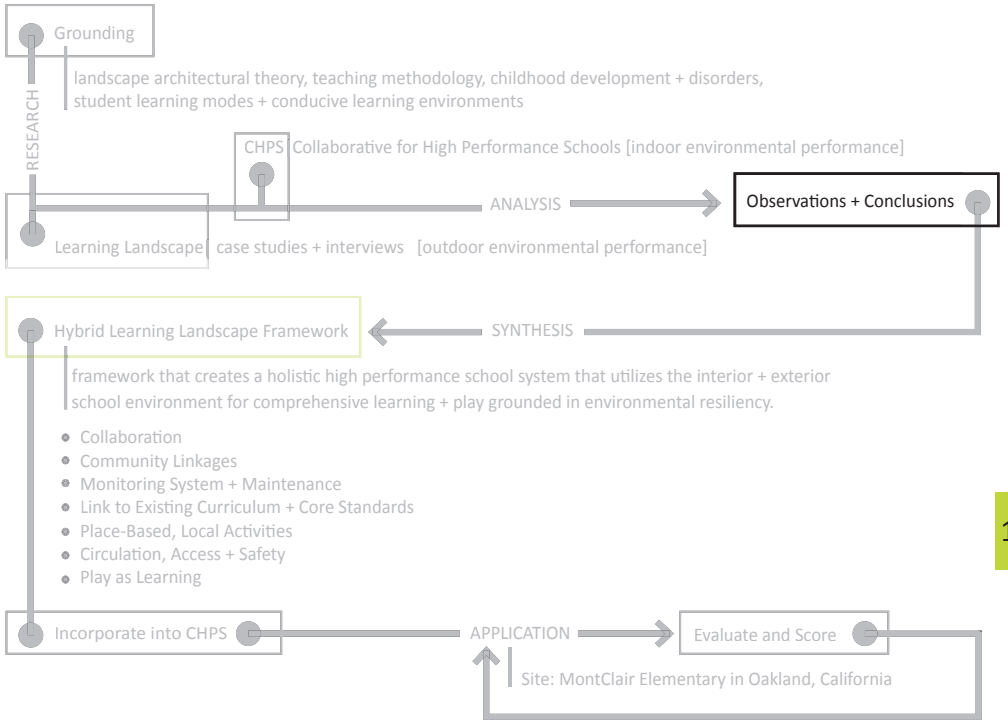


Figure 3.01
Forming Hybrid Learning Landscape Framework
By Author 2011

Grounding research along with research and analysis of Learning Landscapes and the CHPS Program were synthesized by making observations and drawing conclusions about holistic high performance school systems that utilize interior and exterior school environments for comprehensive learning and play grounded in environmental resiliency.

Collaboration

Learning Landscapes and CHPS

Collaboration of students, teachers, parents, community members and staff is essential for the success of the schoolyard as a learning tool. Everyone involved must share the same vision and collaborate when establishing goals. Teacher, parent, community and student representatives should be involved in the design process, serve as co-leaders for decision making and volunteer their efforts. Representatives should also be responsible for recruiting members for team efforts and volunteer activities, search for grants and other funding, and advertise the school learning landscape program.

Grounding Research

Through collaboration, the first step in moving a school towards environmental resilience* is establishing overarching goals from which all decisions will be made. Adopting the goal of environmental resilience is a step towards shifting culture and responds to the realization that children of the coming generations will inherit our world's growing environmental challenges. In order to face these challenges, leaders and citizens will need to be able to think ecologically, understand the interconnectedness of human and natural systems, and have the will, ability and courage to act (Stone and Barlow 2009). When the school establishes the goal, it models environmental resiliency as a community practice and shows that education is the source for social evolution. According to John Dewey, "Education is the fundamental method of social progress and reform," (OWP/P Architects, et al. 2010, 108).

Definitions

**Environmental resilience* seeks to maximize the efficiency and relationship between the ecological, social, cultural and economic systems of a site by adapting to internal and external changes and improving dialog between natural processes and human activity (adapted from Sullivan 2010 and Hill 2005).

Community Linkages

Learning Landscapes and CHPS

Community linkages are important for the long term acceptance and use of the landscape. Open communication and activities should be shared among community members to enable physical and social interaction between students and community members that extend beyond the educational realm and help build healthy, collaborative communities. Community member lectures and presentations in the community and in designated multi-use spaces at the school provide real-world knowledge and expertise through unique perspectives and insights that school educators alone cannot provide. Active community members can potentially serve as links to funding and can introduce relationships with other key social figures beneficial to the school.

Opening physical links to the school through pathways, pocket parks and an open schoolyard increase usership and connectivity for the community. Opening the schoolyard on nights and weekends creates ownership, increases pride and encourages acceptance of the school learning landscape program. Reduction in vandalism and increased safety are also a result of opening the landscape for public use. The school is seen as a community center that links all ages and opens up opportunities for relationships and connections that occur outside of the typical school day.

Grounding Research

Schools are systems and real forms of community life. They are small communities within larger communities that are shaped by students' everyday experiences and relationships, inevitably evolving into the

larger communities. Schools are themselves important nodes in the web of institutions that constitutes society. Whatever happens in schools will have profound effects on the rest of society (Center for Ecoliteracy and Pollan 2008). According to John Dewey "Much of education fails because it neglects the principle that school is a real and vital form of community life, and instead conceives of it as a place where lessons are to be learned and habits formed. Schools fail to become part of the life experiences of the child and so do not truly educate," (OWP/P Architects, et al. 2010, 108). Connecting students with their larger community links people of various ages, provides real world experiences and grounds people to their surroundings. Students will be healthier not only educationally, but physically, emotionally and psychologically (Sobel 1996). Being a part of a community allows access to abundant resources for collaborative problem solving. Problems are inevitable; knowing where to turn when they arise is the difference between overcoming and evolving towards a solution and getting stuck and never progressing.

Community based activities show students the power of working together as a community to make a tangible difference in the world, create more rounded students and establish the school as a core component of community life. "Community experience teaches children how to facilitate change in a complex environment and trains them to be better leaders, communicators, and adaptors. Community involvement shapes students' knowledge of the world and impacts their sense of civic commitment," (CELA 2000, 1). When the students reach out into the surrounding community to learn and make connections, the larger community can also begin to grasp and become familiar with environmental resiliency. When the two begin to work together, the community at large will begin to shift its culture. The success of the community will reflect on adjacent communities and slowly, national culture will evolve.

Monitoring System and Maintenance

Learning Landscapes and CHPS

Monitoring and record keeping will allow the site to improve on its weaknesses and build upon its strengths, encouraging growth of the learning landscape's goals. Improving the site over time based on the needs of the site will encourage long-term use and resiliency. Monitoring and record keeping could also be used as an educational feature that is incorporated into lesson plans.

Adequate maintenance, especially during the summer months, is a key component for long-term success and efficiency of the site as learning and gathering place. Aesthetics contribute to the identity of the space and reflect the level of care and cultural importance of the site. If the site is not well maintained, teachers, students and community members are less likely to use the space both during and out of school season.

Grounding Research

Aesthetic appearance is important for site survival as a socially relevant place over time. Native landscapes often imply there is little or no maintenance performed on the landscape. "Beauty is a necessary component of fostering a sustainable community and it is a key component in developing an environmental ethic," (Meyer 2008, 9). The unmaintained suggests neglect and therefore does not reflect importance for society. A balance between ecologically functional, culturally acceptable and aesthetically pleasing landscape qualities must exist in order to foster long term resiliency of a

site. “Sustainable landscape design must do more than function or perform ecologically; it must perform socially and culturally,” (Meyer 2008, 16).

Link to Existing Curriculum and Core Standards

Learning Landscapes and CHPS

If there is no link or a weak link to existing curriculum and lesson plans the schoolyard will not be used as it is intended. Teachers do not have time or desire to adapt lesson plans that coincide with testing and curriculum standards. Connections must be clear, organized and outcome based to encourage depth of curriculum understanding. Learning zones would most effectively be used if they could be adapted for multiple age and development levels to maximize space efficiency. Hands-on, curriculum based activities that address multiple learning styles* of students should be seen throughout the landscape, not just in the garden component, to maximize outdoor space for curriculum understanding.

Grounding Research

Since January 2010 California’s academic content standards for Kindergarten through 12th grade students must meet the Common Core Standards set by the California State Academic Content Standards Commission (Sacramento County Office of Education 2010). Standards adopted by the California State Board of Education include curriculum obligations for English-language arts, mathematics, history-social science, science, and visual and performing arts.

Children learn in a variety of styles and absorb material unique to different development stages*. Multiple learning styles* corresponds with Gardener’s Multiple Intelligences Theory* and suggests that spaces accommodate the needs of all children so curriculum is comprehended in a way that is best suited for each child. Creating spaces that appeal to different people’s way of learning and interpreting information ensures subject understanding by redundant presentation of material in unique ways. “Individual children test themselves by interacting with their environment, activating their potential and reconstructing human culture. A rich, open environment will continuously present alternative choices for creative engagement. A rigid, bland environment will limit healthy growth and development of the individual or the group,” (Louv 2008, 66).

“Our senses construct reality for us then pass an image of reality to the mind. Our cultural and personal beliefs and bias are projected onto this picture of the world that our senses have created. Our world view is limited by the images that we use to represent the world. If we create new images then we will help find new worlds,” (Picture Theory Productions 2007).

Nature grounds curriculum, so teaching curriculum through nature serves a dual purpose: hands-on application of curriculum and building a relationship with the natural world. According to David Orr, “All education is environmental education. By what is included or excluded we teach students that they are part of or apart from the natural world,” (OWP/P Architects et al. 2010, 137). Through curriculum taught through nature, guidance for living abundantly on a finite planet can be discovered in living soil, food webs, water cycles, energy from the sun and from other ways nature reveals (Stone and Barlow 2009).

Definitions

**Stages of development* (Sobel 1996)
Guidelines for environmental education rely on three phases of environmental curricula during elementary and middle school and early adolescence years.

4-7 (Early Childhood) Activities should center on the

developmental tendency toward empathy with the natural world. Activities like- becoming the animals and plants

8-11 (Elementary) Discover and explore- gardening, reading about living off the land, following streams and paths, caring for animals/plants, searching- hunting and gathering, storytelling

12-15 (Early Adolescence) Abstract Ideas, relationships and Social action should be central role- school recycling, passing town ordinances, planning and going on school trips.

**Multiple learning styles* refer to the different ways children learn. Multi-sensory exploration and discovery goes beyond hearing and seeing and reaches five other [non-traditional] ways children learn. There are seven senses (physical receptors) that directly link the human body to the surrounding world which ensures comprehension through compound layers of experience that activates more than one of the senses (Kanics OTR/L 2010).

Seven Senses (adapted from Kanics OTR/L 2010, 11)
1. [Tactile] skin for touch "…where the body ends and the rest of the world begins…"
2. [Proprioception] muscles, tendons + joints for body position + force needed for an activity
3. [Vestibular] inner ear for body movement, gravity, balance + posture
4. [Visual] eyes for sight + visual experience (colors, visual pattern and light reflection)
5. [Auditory] ears for sound
6. [Taste] mouth
7. [Smell] nose

**Howard Gardner's Multiple Intelligences Theory* responds to the way in which people solve problems and learn tasks. The seven intelligences include linguistic, logical-mathematical, musical, bodily-kinesthetic, spatial-visual, interpersonal, and Intrapersonal. Designing for multiple intelligences asks designers to create variety in learning spaces including diverse sizes, materials, and colors, as well as spaces with different transparency, connectivity, and agility (OWP/P Architects, et al. 2010).

Place-Based, Local Activities

Learning Landscapes and CHPS

Incorporating history, culture and natural features of the surrounding community and region allow the school site to be connected physically, visually, mentally and socially giving the site an identity that is unique. Place-based, local activities allow a greater connection between people and their surroundings that can improve hands-on problem solving skills through immediate application and observation. Being engaged with local surroundings allows students and communities to remain connected to their heritage and make informed decisions about local issues.

Grounding Research

Place-based education is grounded in family, culture and natural history that resonates in a personal way, requiring student to leave the confines of the classroom and engage in frequent interaction with community members and nature to begin to learn and read the world in an authentic and integrated way," (Sobel vi, 1996). Place based education is a "web that binds the generations and reinforces our sense of responsibility toward our places. It holds the stories and experiences that reveal a community's true identity and shows us our own uniqueness as well as our connectedness with all life," (Sobel Vii, 1996). The way people interact with nature as a child directly affects their attitude and appreciation for it as an adult. "How the young respond to nature, and how they raise their own children, will shape the configurations and conditions of our cities, homes and daily lives," (Louv 3, 2008).

Grounding education in nature will teach children how they are interconnected with their surroundings and will enable dialog with nature at a young age. They will be faced with many escalating environmental challenges as they reach adulthood and will need an understanding of the interrelationships that exist in order to look at problems holistically. They must first come to know and understand the world around them in order to overcome these issues. "What is important is that children have an opportunity to bond with the natural world, to

learn to love it, before being asked to heal its wounds," (Sobel 1996, 9). Introducing children to global issues too soon will cause anxiety and fear about the natural world. Instead, introducing them to local challenges that they can tackle will build problem solving skills, relationships through experience and show how their contributions benefit their community. Their experiences and knowledge will be built upon as they go through life. As they grow in ability and concern they can learn how to make a difference at larger scales. "If we prematurely ask children to deal with problems beyond their understanding and control, prematurely recruit them to solve the mammoth problems of an adult world, then I think we cut them off from the possible sources of their strength," (Sobel 1996, 5).

According to Robin Moore, nature experiences help children understand the realities of natural systems through primary experience. They demonstrate natural principles such as networks, cycles and evolutionary processes (Louv 2008). Through nature, students will learn that long-lasting change requires looking beyond individual problems to find the relationships between all problems (Center for Ecoliteracy and Pollan 2008).

Circulation, Universal Access and Safety

Learning Landscapes and CHPS

Safety and circulation are two of the most important features for a learning landscape. There is great cost associated with liability issues. Risk can be dramatically reduced by maintaining clear circulation routes, creating hierarchy of spaces, using adequate screens and barriers, and maintaining clear site lines to key elements for seated and standing users. Program elements' proposed use must be easy to interpret in order to ensure use and minimize safety hazards.

Minimal parking and increased use of alternative modes of transportation including transit, walking and biking are important elements for shifting the culture towards environmental resiliency. Carbon emission reduction and increased pedestrian connectivity can be achieved through design efforts.

Flexibility, adaptability and universal design* are important characteristics of a learning landscape environment because it accommodates all mobility, age and development levels. Spaces should be available for student and community gathering, learning and playing, and weekend or school day activities. Maximizing flexibility encourages use, care and long-term social relevance and site resilience.

Grounding Research

According to Abraham Maslow's research on the hierarchy of individual needs*, people cannot begin to learn until their basic needs are fulfilled. Beginning at the most basic level of physiological needs and building to self-actualization is a successive process that directly influences people's ability to learn and develop as an individual. "Children are ready to learn only when they are safe and secure, so address those needs before considering any other aspect of a child's environment," (OWP/P Architects, et al. 2010, 35).

Definitions

**Universal Design,* according to Ron Mace*,* is the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design (North Carolina State University, 2008).

**Maslow's Hierarchy of Needs* (OWP/P Architects, et al. 2010, 34)

1. Physiological: Food, Water, Shelter and Warmth
2. Safety: Security, Stability and Freedom from Fear
3. Belonging/Love: Friends, Family, Spouse and Lover
4. Self-Esteem: Achievement, Mastery, Recognition

and Respect
5. Self-Actualization: Pursue Inner Talent, Creativity and Fulfillment

Play as Learning

Grounding Research

Play is the foundation of intellectual exploration. It's how children learn how to learn. "Abilities essential for academic success and productivity in the workforce, such as problem solving, reasoning, and literacy, all develop through various kinds of play, as do social skills such as cooperation and sharing," (Linn 2008, 11). Multi-Sensory, multi-scaled play elements enable various forms of physical and social interaction and development. They learn from the activity of play and from other children playing around and with them. When there are more opportunities for various sensory play experiences, children are more likely to include other children who typically stand out from the crowd (Wolfberg 2010).

Outdoor play environment qualities most appreciated by children include: colors in nature, trees, woodlands, shifting topography, shaded areas, meadows, places for climbing and construction, and challenging places to explore and experience (Fjortoft 2004). Children have a desire for more complex, challenging and exciting play environments than the traditional playgrounds usually offered them. Open-ended spaces and the forms of landscapes and objects often have associative qualities and give meaning to children's play and imagination (Titman 1994).

Play environments should be open ended and encompass functional, constructive and symbolic play. Functional play refers to the physical play activities: identified and categorized in subgroups such as running and tumbling, climbing rocks and sliding slopes, climbing trees, and playful skiing. Constructive play refers to building huts and shelters and playing with loose parts, sticks and pebbles. Symbolic play refers to role-play, dramatic play and social play like play houses and pirates (Fjortoft 2004). "While timing and the rate of development may vary, all children need to develop in five crucial areas for proper growth: social/emotional, intellectual, sensory, perceptual/motor, and physical. Play environments must be powerful enough to sustain the child's interest and motivation without constant motivational and directional assistance from an adult," (OWP/P Architects et al. 2010, 204).

The Benefits of Playing Outdoors (King 2010, 3).
1. More creative, imaginative play
2. Emotional coping and stress reduction
3. Improved physical health and motor coordination
4. Cognitive, social and sensory development
5. Concentration, self-control and self-discipline
6. Creative problem-solving skills
7. An appreciation for the environment, stewardship

Essential Program Elements

Learning Landscapes and CHPS

Program elements that are seen as essential include a garden component, recycling and composting, shade elements and art. A garden can be easily adapted for all core subjects. Children today are generally disconnected from where their food comes from. Gardens can teach lessons like: where food comes from, how to grow food and how to be self-sufficient. Recycling and composting can be easily incorporated into the garden and school lunch program that encourages a connection with nature and environmental appreciation. Shade features such as plants and built elements are important for weather protection and encourage seasonal use. Student and public art encourage reflection, enhance the ownership and pride in the landscape and can serve as a connection between people and nature.

synthesis

"Design cannot change society, it can alter an individual's consciousness and perhaps assist in restructuring priorities and values," (Meyer 2008, 10).

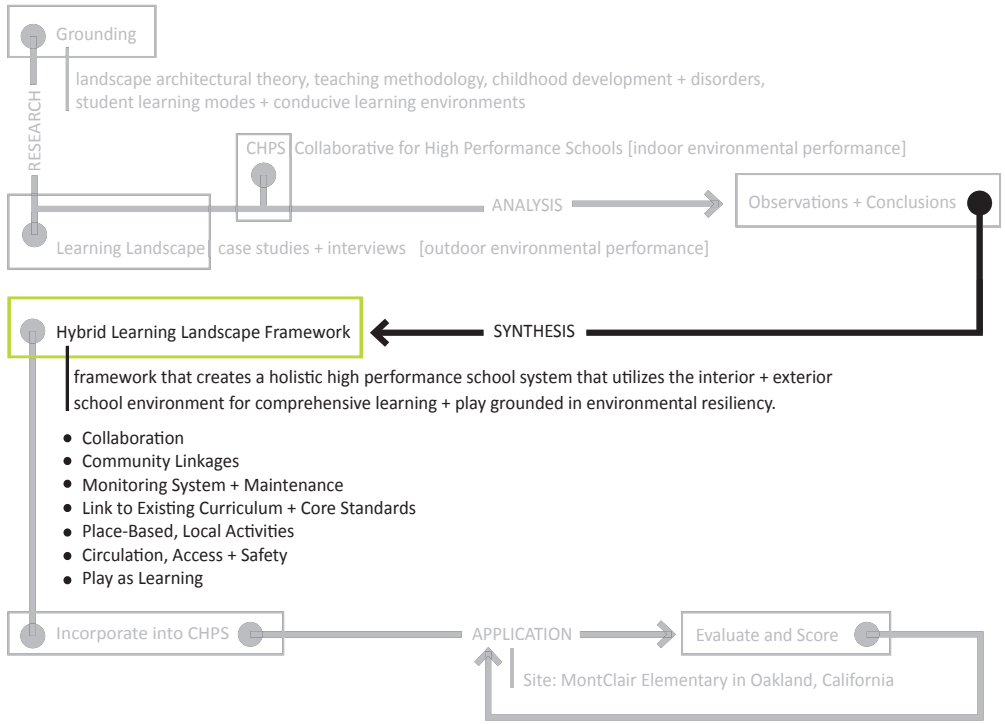


Figure 3.01
Forming Hybrid Learning Landscape Framework
By Author 2011

Synthesizing grounding research, observations and conclusions of Learning Landscape case studies and interviews, and observations made from the CHPS program results in principles that make up comprehensive learning and play environments that are grounded in environmetnal resiliency. These principles include collaboration, community linkages, monitoring, maintenance, linking schoolyard with existing curriculum and core standards, place based local activity, circulation, universal access, safety and play as learning. The principles were organized according to their programmability to form Hybrid Learning Landscape Framework.

Hybrid Learning Landscape Framework

Non-Programmable Elements- Political Realm

1) Collaboration of students, teachers, parents, community members and staff
    a. Vision and goals
    b. Design process
    c. Volunteer efforts
    d. Continued Funding
    e. Advertising
2) Community linkages
    a. Lectures and presentations
    b. Open Schoolyard
3) Monitoring System and Maintenance
    a. record keeping, observing

Programmable Elements- Physical Realm

1) Community linkages
    a. Adaptable, Multi-use spaces
    b. Paths and pocket parks
    c. Open Schoolyard
    d. Educational features
2) Link to Existing Curriculum and Core Standards
    a. Provide Multiple learning styles
    b. Age and Development levels continuum
    c. Nature based activities
3) Place based, local activity focus
    a. History
    b. Culture
    c. Natural Features of community and region
4) Circulation, Universal Access and Safety
    a. Minimize vehicle parking and enhance usability of alternative modes
    b. Universal access
5) Play as Learning
    a. functional, physical and symbolic play
6) Monitoring System
    a. display monitors linked to online databases

Table 3.01
Hybrid Learning Landscape Framework
By Author 2011, adapted from CHPS 2007, CHPS 2009 and Brink and Yost 2004

incorporation into CHPS

"Our world view is limited by the images that we use to represent the world. If we create new images then we will help find new worlds," (Picture Theory Productions 2007).

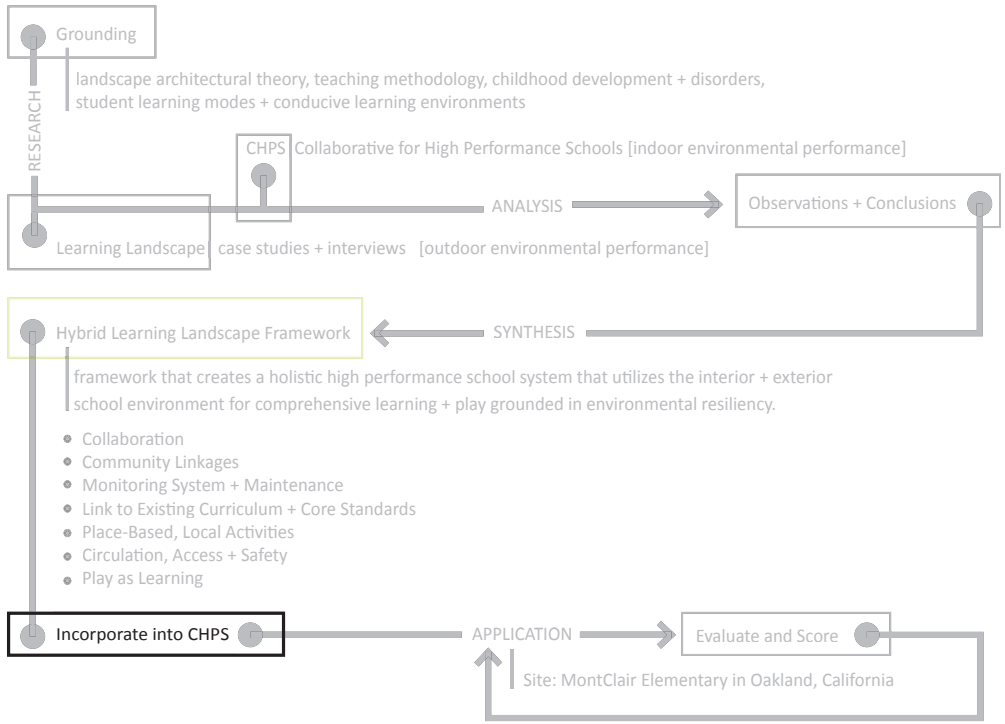


Figure 3.01
Forming Hybrid Learning Landscape Framework
By Author 2011

Hybrid Learning Landscape Framework is incorporated into the CHPS program by merging its principles with the existing CHPS scorecard credits for the development category *New Building on an Existing Campus*.

Why CHPS?

CHPS was chosen as a method for applying Hybrid Learning Landscape Framework for several reasons. The CHPS organization is a growing western United States, regional leader for designing high performance school environments that are grounded in principles of environmental resilience (CHPS 2007). CHPS is always looking for ways to advance and evolve their current rating system to move schools further towards environmental resilience. The existing scoring system used by CHPS relates to Hybrid Learning Landscape Frameworks through existing goals and credit points. Sections where CHPS could be improved directly relate to the principles of Learning Landscape Framework. Although minor improvements can be made throughout all sections of the CHPS scorecard system, the main sections that need improvements are School as Learning Tool and a proposed section, Continued Verification.

The Hybrid Learning Landscape Framework application site, MontClair Elementary, has a new building and site improvements planned for May of 2011 that are CHPS verified but the improvements only minimally address the schoolyard as an integrated learning and play component. Using a program that is already understood by facilitators of the school will increase the chances Hybrid Learning Landscape Framework will be incorporated into the site, allows communication about the framework to be easier by sharing a common language, provides quantified incentive for implementing the framework and improves the current CHPS program. Design application to MontClair Elementary can be seen in chapter five, starting on page 46.

Table 3.02
Hybrid Learning Landscape Framework- Merged with CHPS
By Author 2011, adapted from CHPS 2007, CHPS 2009 and Brink and Yost 2004

Hybrid Learning Landscape Framework: Merged with CHPS

Red indicates application to the CHPS scorecard for the development category *New Building on an Existing Campus* (refer to Appendix f, page 114, for full CHPS Scorecard Proposed Improvements).

Non-Programmable Elements- Political Realm

1) Collaboration of students, teachers, parents, community members and staff
    a. Vision and goals- existing credit LEI1.2
    b. Design process- existing credit LEI1.2
    c. Volunteer efforts- added credit VC2.0
    d. Continued Funding- added credit VC3.0
    e. Advertising- added credit VC4.0
2) Community linkages
    a. Lectures and presentations- added credit VC6.0
    b. Open Schoolyard- added credit VC5.0
3) Monitoring System and Maintenance-
    a. Record Keeping, Observing- added credit VC1.0

Programmable Elements- Physical Realm

1) Community linkages
    a. Adaptable, Multi-use spaces- existing credit LEI3.2, adapted credit SS1.3, added credit LEI2.5/SS4.4
    b. Paths and pocket parks- adapted credit SS2.2, added CL2.4
    c. Open Schoolyard- added credit LEI2.6
    d. Educational features- existing credit LEI2.0/SS4.3, adapted credit LEI2.1/LEI2.2
2) Place based, local activity focus
    a. History- added credit LEI2.3
    b. Culture- added credit LEI2.3
    c. Natural Features of community and region- existing credit SS3.1/SS3.2/EQ1.1, adapted credit EE2.1, added credit WE1.3/CL2.4
3) Link to Existing Curriculum and Core Standards
    a. Provide Multiple learning styles- added credit LEI2.3
    b. Age and Development levels continuum- added credit LEI2.3
    c. Nature based activities- adapted credit LEI2.4
4) Circulation, Access and Safety
    a. Minimize vehicle parking and enhance usability of alternative modes- existing credit SS2.2/SS2.3, added credit SS2.4
    b. Universal access- added credit SS4.3
5) Play as Learning
    a. functional, physical and symbolic play- added credit LEI2.3
6) Monitoring System
    a. display monitors linked to online databases- existing credit WE3.1/CL1.1, added credit CL2.3, adapted EE2.2

04 site overview

Figure 4.01
K+1 Asphalt Playground
By Author 2011

Figure 4.02
Expansive Asphalt Playground
By Author 2011

Figure 4.03
Terraced Asphalt Surface Treatment
By Author 2011

site overview

"I am struck by the fact that the more slowly trees grow at first, the sounder they are at the core and I think the same is true of human beings," (Thoreau 1892, 222).

MontClair Elementary is an urban middle-income school with constricted boundaries, terraced asphalt schoolyard and increasing student population. The social dynamics within the school are very strong, with a supportive and engaged faculty and parent groups. Within the next few years, Mont-Clair Elementary is expecting to double their student population, totaling 600, which will not be supported by the current facilities. As a result, ten million dollars was issued by the Oakland Unified School District to fund site additions and improvements for MontClair Elementary.

Gould Evans Baum Thornley Architects and a landscape architecture firm, Golden Associates, worked with school faculty and staff, parents and students to develop a site plan that addressed school goals and meet program requirements. The plan includes a CHPS certified classroom building and multi-purpose building with a green roof, a bioswale and renovated student garden. The site plan was approved and is slotted for construction in the fall of 2011. The school's overarching goal is to be the first school in the district aimed towards environmental resiliency and serve as a model for other school renovations in the area.

site inventory

According to Rudolf Steiner, "Our highest endeavour must be to develop individuals who are able-out of their own initiative- to impart purpose and direction to their lives" (Rudolf Steiner School 2011).

MontClair Neighborhood Location + Context

MontClair Elementary is located in the neighborhood of Montclair that rests in the valley of the heavily forested redwoods of the Oakland Hills in Alameda County, Oakland, California (refer to Figure 4.04). Although there is no formal boundary according the city, the general boundaries of the neighborhood of MontClair are Highway 24 to the north, State Route 13 to the west, Skyline Boulevard to the east, and Joaquin Miller Road to the south. MontClair Elementary's general student jurisdiction lies within the neighborhood of MontClair. Its boundaries are Moraga Avenue and Oakwood Drive to the north, Skyline Boulevard to the east, Shepherd Canyon Road to the southeast and Piedmont, California to the southwest (refer to Figure 4.05).

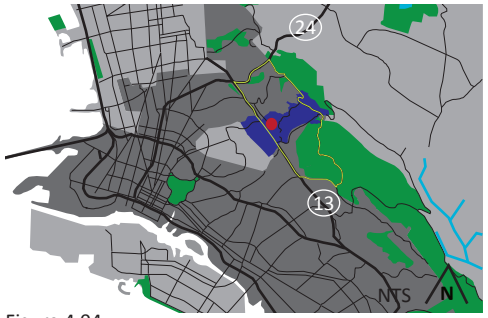
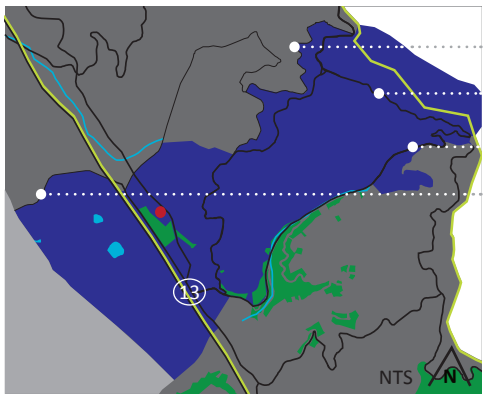


Figure 4.04
MontClair Neighborhood in Oakland, California
By Author 2011, adapted from Google Maps 2010 + OUSD 2010

KEY
- MontClair Elementary
- Oakland, California
- Piedmont, California
- MontClair Neighborhood Boundary
- MontClair Elementary Student Jurisdiction
- Oakland Hills + Parks
- Roads
- Lakes and Creeks



Oakwood Drive

Skyline Boulevard

Shepherd Canyon Road

Moraga Avenue

Figure 4.05
MontClair Elementary Student Jurisdiction
By Author 2011, adapted from OUSD 2010

MontClair Neighborhood History

The valley where the neighborhood of MontClair resides was formed by the Hayward Fault which still has active lines in MontClair Park today. The neighborhood rests between Temescal Creek to the northwest and the north fork of Sausal Creek to the southeast. Prior to modern development, the Ohlone Indians populated the general area. In the 19th century logging was a major industry which led to the first European settlement. During the first half of the 20th century the Sacramento Northern Railroad ran through the southern end of the MontClair Neighborhood. Automobiles soon followed and brought new housing development and increased population (adapted from Dunn 1998 and MontClair Village Association 2010).

MontClair Rail Road Trail, a bicycle and pedestrian path, is now located in the right-of-way that once held the railroad system (Dunn 1998). The trail ends near Cortereal Avenue and Medau Place in the MontClair Village Shopping District. A pedestrian bridge crossing Moraga Avenue and State Route 13 connects MontClair Park to Bruns Court residences (refer to Figure 4.06).

MontClair Neighborhood Demographics

The Neighborhood of MontClair is home to 33,442 inhabitants. It contains the MontClair Village shopping district filled with shops, restaurants, cafes and bars. The residential district is mostly single family and is nestled into the hilly, winding streets of the Oakland Hills. Three elementaries are represented in MontClair Neighborhood, including MontClair Elementary. A community library and several parks, including MontClair Park also serve the neighborhood (Montclair Village Association 2010).

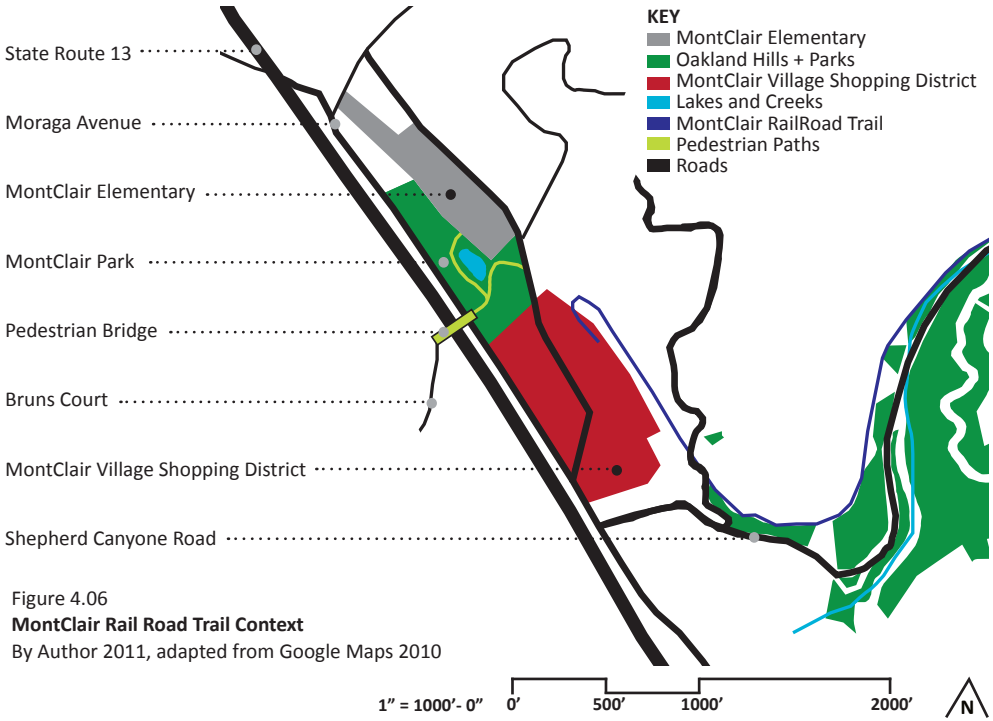


Figure 4.06
MontClair Rail Road Trail Context
By Author 2011, adapted from Google Maps 2010

MontClair Elementary Location + Context

MontClair Elementary is a public Kindergarten through fifth grade school located at 1757 Mountain Boulevard on a 3.5 acre campus. It shares its southwest border with 7.3 acre MontClair Park and is less than a quarter mile northwest of the MontClair Shopping District. It is surrounded by medium income single family housing (refer to Figure 4.07).

MontClair Elementary History

Montclair Elementary was built in 1925 in response to housing development in the MontClair Neighborhood. It held four classrooms for 87 students, grades kindergarten through fourth. Being made of brick with a tile roof, it was later deemed at risk of earthquake damage and was replaced by the current facilities of today. Facilities include a building with 9 classrooms, an administrative suite, arts room, Parent Teacher Administration room and library as well as a building added in 1947 that serves as a cafeteria and assembly hall. Because of increasing student population, ten portable classrooms were added to the site in more recent years (MontClair Elementary 2010).

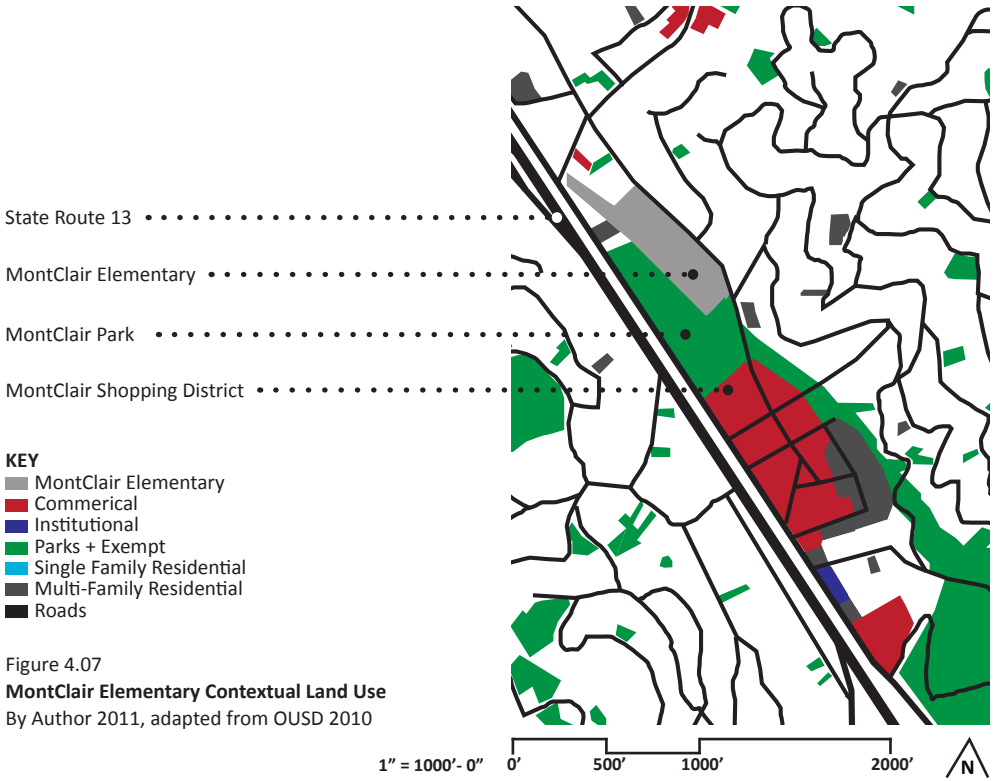


Figure 4.07
MontClair Elementary Contextual Land Use
By Author 2011, adapted from OUSD 2010

MontClair Elementary Demographics

Montclair Elementary is experiencing a significant increase in student population. The school has maintained an average of 350, 5-11 year old students since year 2000 (Education Data Partnership 2010). The 2009-2010 student population increased to 420. Within the next few years the school's student population is expecting to increase to 600.

Staff includes twenty teachers, a principal, a secretary and maintenance personnel (MontClair Elementary 2010). Students are of mostly white ethnicity with African American, two or more races, Asian, Hispanic, Filipino and Pacific Islanders following (refer to Figure 4.08). English learners and instruction in five language courses increase every year.

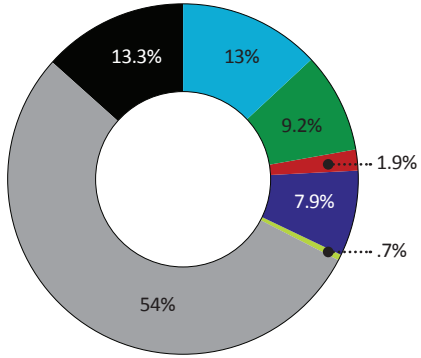
Proposed Fall 2011 Site Plan

Ten million dollars was issued by the Oakland Unified School District to fund MontClair Elementary site improvements. Gould Evans Baum Thornley Architects, Golden Associates and several engineers were chosen to work collaboratively with school faculty and staff, parents and students to develop a site plan that addressed project goals. The resulting proposed site plan includes a CHPS verified classroom building and multi-purpose building with green roof, a bioswale and renovated student garden. The site plan was approved in 2010 and is set for fall 2011 construction. Refer to Figure 4.09.

MontClair Elementary Circulation and Accessibility

The proposed buildings are universally accessibly by use of pedestrian bridges, stairs an interior elevator connecting the second floor to the ground floor. The existing buildings, including the portable classrooms, are universally accessible from the main entry points through universally accessible ramps.

The schoolyard is a paved asphalt, terraced surface that encompasses over 55 feet of grade change. The flat areas between the terraces are universally accessible, but 12-15 foot tall, chain link safety fencing runs parallel with the terraces and acts as a barrier between flat surfaces. Therefore, access between flat surfaces is limited to those with full mobility through a series of gates. Fencing also runs along the boundary of the site and along the base of Feather Hill.



KEY

African American	48	13%
Asian	34	9.2%
Filipino	7	1.9%
Hispanic	29	7.9%
Pacific Islander	2	.7%
White	199	54%
2 or more races	49	13.3%
	368	100%

Figure 4.08
MontClair Elementary Student Ethnicity
By Author 2011, adapted from Education Data Partnership 2010

MontClair Elementary Land Use

The proposed fall 2011 site plan for MontClair Elementary prepared by Gould Evan Baum Thornley Architects and Golden Associates has a high ratio of asphalt to accessible vegetation. Asphalt covers approximately 47 percent of the site while 39 percent is vegetation or other softscape material. Of the 39 percent, eight percent is accessible vegetation. Buildings take up 14 percent of the land use. Refer to Figure 4.10.

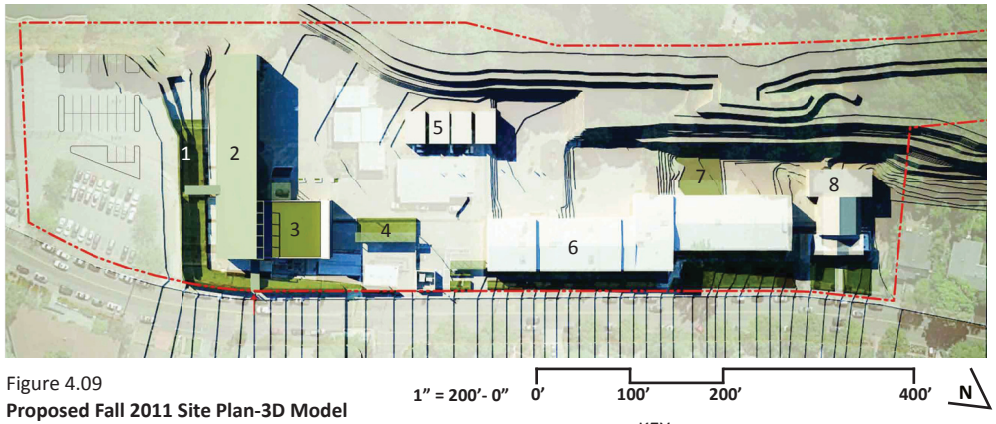
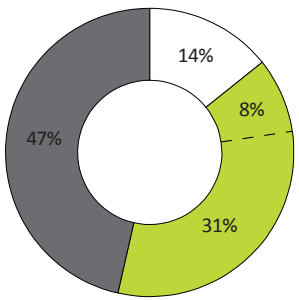


Figure 4.09
Proposed Fall 2011 Site Plan-3D Model
Courtesy of Gould Evans Baum Thornley Architects 2011

KEY
1. Proposed Outdoor Classroom
2. Proposed Classroom Building
3. Proposed Multi-Purpose Building
4. Proposed Garden Renovation
5. Existing Portable Classrooms
6. Existing Classroom Building
7. Proposed Bioswale
8. Existing Multi-Purpose Building



KEY
- trees
- 47% hardscape
- 39% softscape/vegetation (8% accessible)
- 14% buildings
- universal access points
- fencing

Figure 4.10
Proposed Fall 2011 Site Plan: Land Use
By Author 2011, adapted from Gould Evans Baum Thornley Architects 2011

Site Conditions *after Fall 2011 Site Plan Implementation*

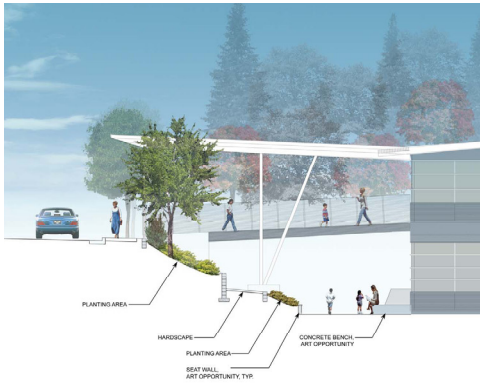


Figure 4.11
Proposed Outdoor Classroom Section
Courtesy of Gould Evans Baum Thornley Architects 2011

Figure 4.12
MontClair Park + Elementary School Existing Link
Courtesy of Jim Ryugo 2011

Figure 4.13
Feather Hill Backdrop + 12-15' Perimeter Fencing
By Author 2011

Figure 4.14
Proposed Building Perspective from Mountain Boulevard
Courtesy of Gould Evans Baum Thornley Architects 2011

Proposed Fall 2011 Site Improvements

The proposed outdoor classroom provides teaching space and planting beds for students (refer to Figure 4.11). Entries into the proposed building are universally accessible from the school's parking lot and Mountain Boulevard (refer to Figure 4.14). A bioswale and student garden renovation are also part of the site plan but conceptual images were not available. Much of the site will remain unchanged (refer to Figures 4.12, 4.13, 4.15, 4.16-4.21.

Figure 4.15
Existing Building + Asphalt Terracing
By Author 2011

Figure 4.16
Desolate + Uninviting Lunch Area
By Author 2011

Figure 4.17
Existing Student Sidewalk along Mountain Boulevard
Courtesy of Gould Evans Baum and Thornley Architects 2011

Figure 4.18
Disorganized Parking Lot + Inaccessible Tennis Courts
By Author 2011

Figure 4.19
Sterile Playground Environment and Fenced Terrace
By Author 2011

Figure 4.20
Asphalt Terracing + Heavily Shaded Playground
Courtesy of Jim Ryugo 2011

Figure 4.21
Fence Barrier on Terrace
By Author 2011

site analysis

Understand, love and enjoy the world which is around you in space and behind you in time. The more you are a part of your world, the more inspired you will be,

(Eckbo, 1950).

Major Site Issues

There are several issues facing the school facilities affecting the campus unity, identity, aesthetics and functionality of the site. Disconnect occurs between facilities on campus and between the existing classroom building and the schoolyard. There is a weak link between curriculum and schoolyard. Lack of shade and accessible vegetation, too much asphalt and heat island effect, weed control and limited maintenance also characterize the campus. Trash and recycling are unsightly and inconveniently placed. Awkward asphalt terracing of the site with inconvenient and unsightly safety fences separating major elevation change limits the functionality and aesthetic appeal of the schoolyard.

Major Site Assets

Major features for the school include outdoor classroom, native plantings and school group support. The outdoor classroom creates an outdoor learning environment capable of incorporating curriculum into the schoolyard and implements native California plants. The student garden is for vegetable production and composting. The active community, parent and teacher volunteer groups create a strong foundation for the school. They are committed to the implementation and maintenance of the gardens and art projects in the landscape.

Groups/Programs related to Outdoor Learning

- C.O.M.P.O.S.T.- Children of MontClair Planting Our Soil Together is a group of volunteer parents that have garden lessons and activities for kids 1-2 times a month relating curriculum to outdoors. Lessons are linked to nutrition, measurement, biology and history. Compost Gardening Day occurs two times a year and includes parents willing to volunteer on a Saturday to weed and clean-up the garden (MontClair Elementary 2010).

- Green Team- The green team encourages sustainable practices in school and at home. The team participates in the COMPOST program, Zero Waste Lunch Program, School-Wide Recycling and 'Greening' of school events, Walking and Carpooling Program, paper reduction in parent communication, Climate Action Contest, Coordination with local creek and park activities, sustainable themed art for new building design and energy efficiency measures in the existing facility (MontClair Elementary 2010).
- PTA-Parent Teacher Association are

volunteers that work together to improve the overall education of the students. “The strength and success of Montclair Elementary comes from the direct involvement of parents who not only care about the quality of their child’s education, but also about the physical learning environment in which their children spend so many of their days (MontClair Elementary 2010). The PTA sponsors daily enrichment programs such as music, art, library, computers and drama.

- Other- Language league, Dad’s Club, afterschool programs such as Art, Chess, Cooking, Drama, Storytelling, Science, Magic and Yoga.

05 design application

Figure 5.01
Water and Mountain by Sesshu Toyo 1495
http://www.okara.com/assets/images/Sesshu-CU-CroppedViewOpt.jpg 2011

design application

"Sustainable landscape design must do more than function or perform ecologically; it must perform socially and culturally," (Meyer 2008, 16)

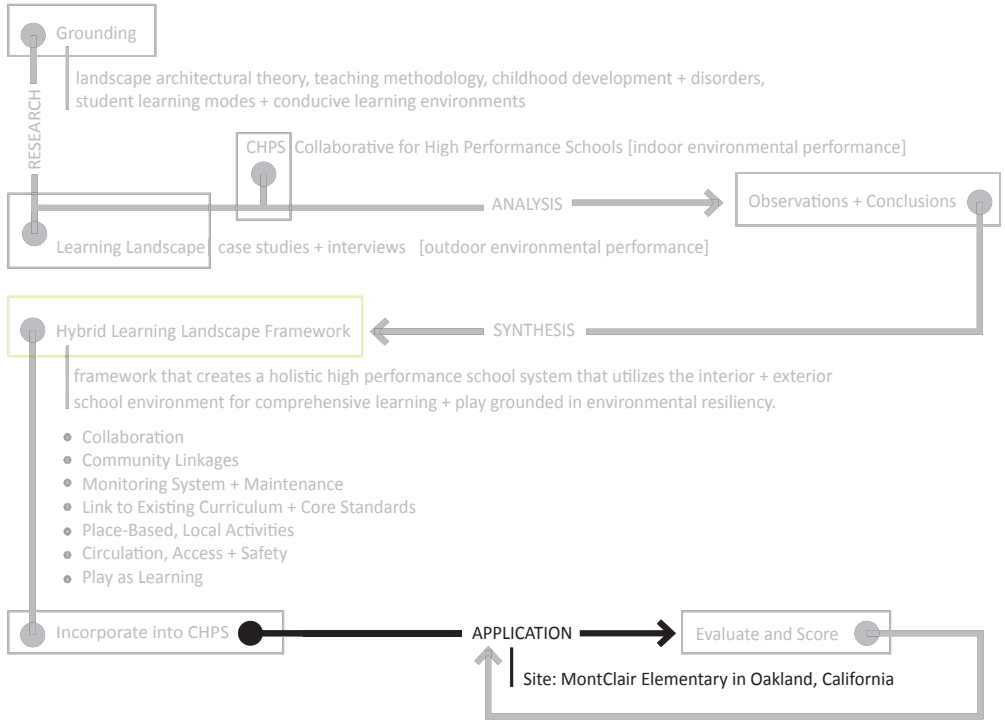
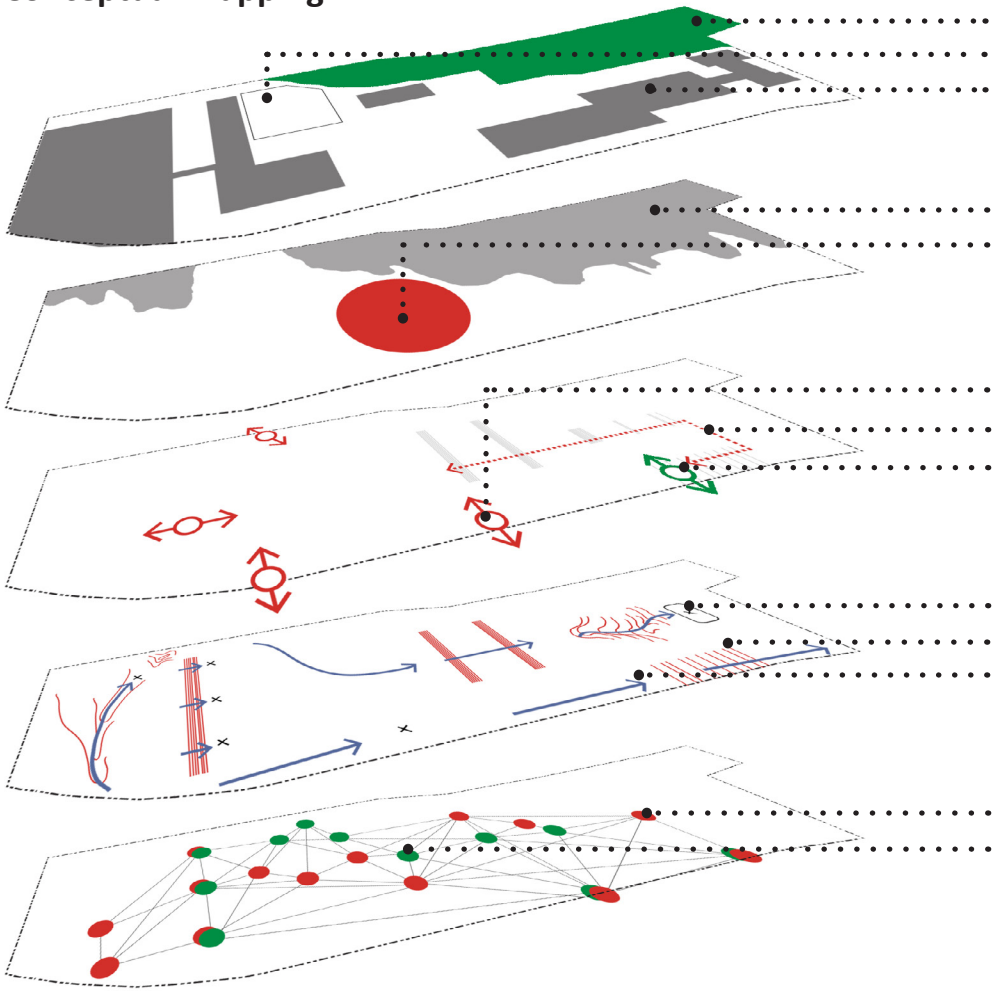


Figure 3.01
Forming Hybrid Learning Landscape Framework
By Author 2011

Hybrid Learning Landscape Framework was applied to MontClair Elementary in Oakland, Califoria resulting in site program elements that work together to create a holistic high performance school system.

Conceptual Mapping



Existing Features to Maintain
Feather Hill
Asphalt Playing Field
(e) Buildings

Shadows and Sun
Mostly Shaded
Full Sun

Universal Access
Access Points
Limited Access
Main Access Point

Stormwater Strategy
Catchment System
Major Topography Influences
Flow towards the NorthWest

Active and Passive Zones
Passive Activity
Active

Conceptual mapping helps to understand site interrelationships. Initial mappings of site features to maintain, shadows and sun, and universal access informed design decisions affecting the stormwater strategy and placement of active and passive zones.

Figure 5.02
Conceptual Mapping
By Author 2011

Conceptual Design

Snake in the Grass reflects the native plant and animal characteristics of the Oakland, California area and symbolizes the site's desire to re-establish its connection with nature. *Snake in the Grass* inspired the major circulation route carried through the site, connecting active learning and play zones with passive learning and resting zones.

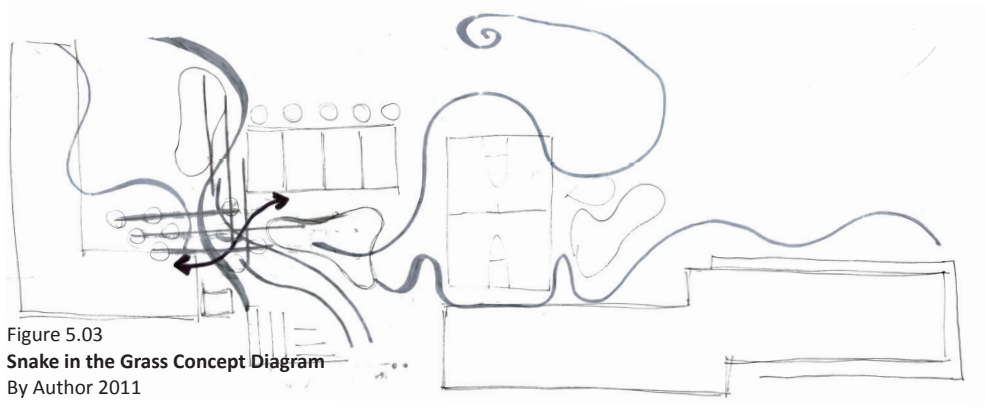


Figure 5.03
Snake in the Grass Concept Diagram
By Author 2011

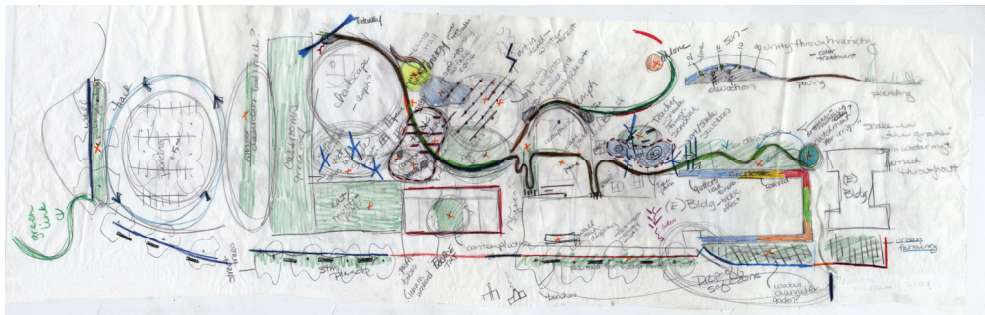


Figure 5.04
Concept Development
By Author 2011

Figure 5.05
MontClair Elementary- Hybrid Learning Landscape Framework Master Plan
By Author 2011, base map courtesy of Golden Associates 2011

KEY

1. Parking
2. Pocket Park
3. Stormwater Treatment- Bioswale Zone
4. Universal Access Boardwalk
5. Outdoor Classroom with Seating
6. Proposed (P) Classroom Building with Green Roof
7. (P) Multi-purpose Building with Green Roof
8. Gateway Connection to MontClair Park
9. Existing (E) Asphalt Kickball Field Zone
10. Shadow Sundial
11. Lunch Area Tree Grove
12. Recycling, Sink and Service Dock
13. Service Court
14. Active Balance and Climb Zone
15. Passive Resting Area
16. (E) Portable Classrooms
17. Energy Generating Playground Zone
18. Student Garden Zone
19. Performance Zone (Amphitheater, Basketball Court and Stage Elements)
20. Univeral Access Ramps
21. (E) Classroom Building
22. Ohlone Indian History K+1 Zone
23. Urban Gardens
24. Underground Rainwater Catchment
25. (E) Multi-purpose Building
26. Entry Drop-Off/Pick-Up Court

Notes:

- all plantings are native
- preserve existing trees on campus
- 2-3 bicycle racks to be placed along Mountain Boulevard
- CHPS display monitors linked to online databased to be strategically placed throughout landscape

KEY

1. Parking
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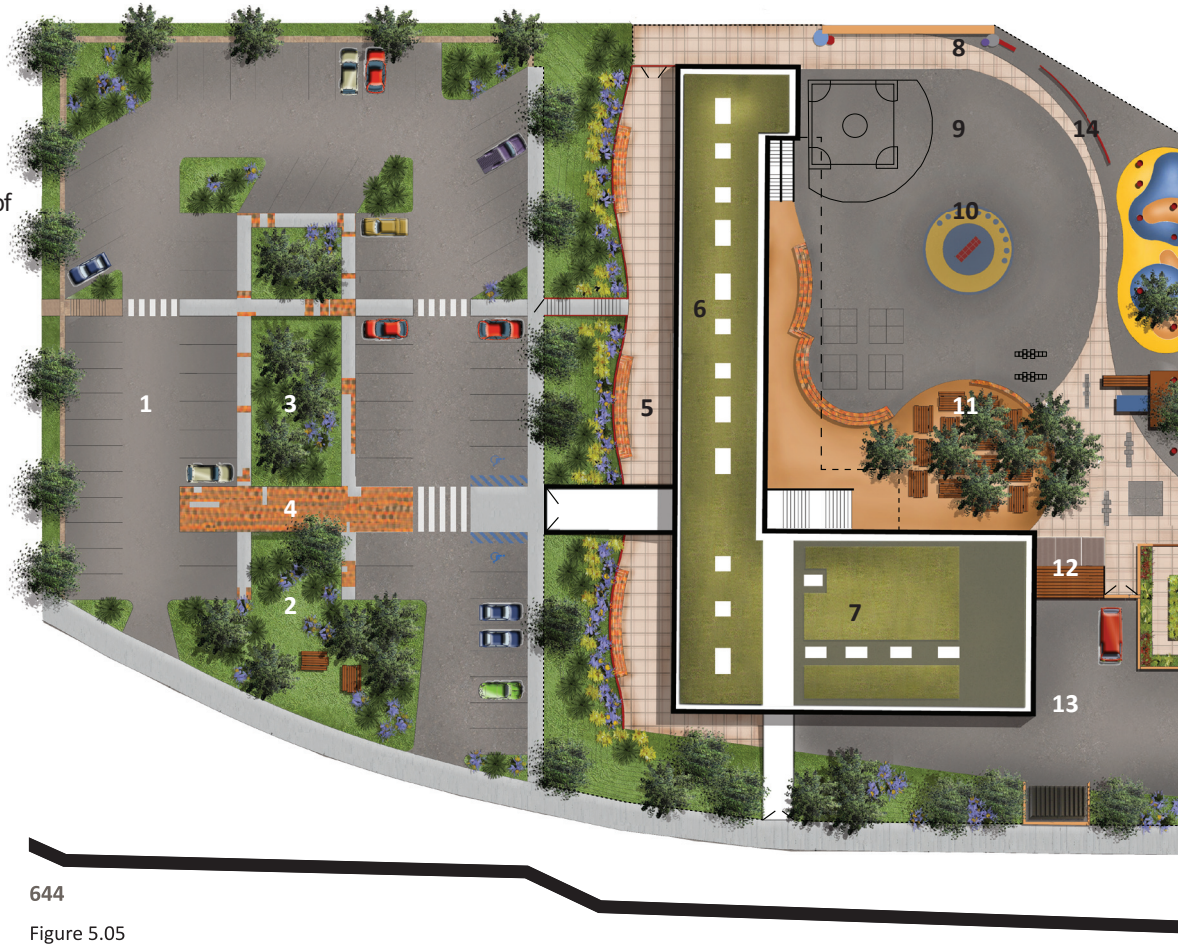

Figure 5.05
MontClair Elementary- Hybrid Learning Landscape Framework Master Plan
By Author 2011, base map courtesy of Golden Associates 2011


16
15
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18
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23
589
1" = 65'- 0"
0'
32.5'
65'
130'
N

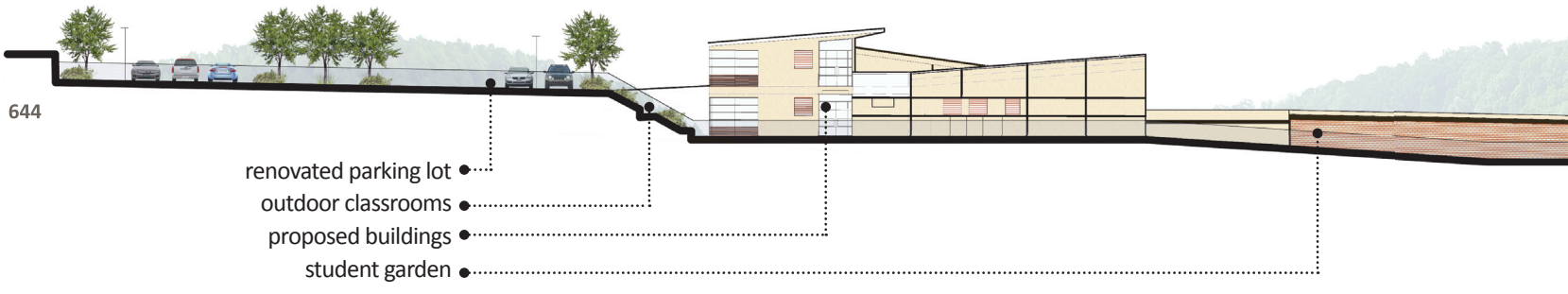
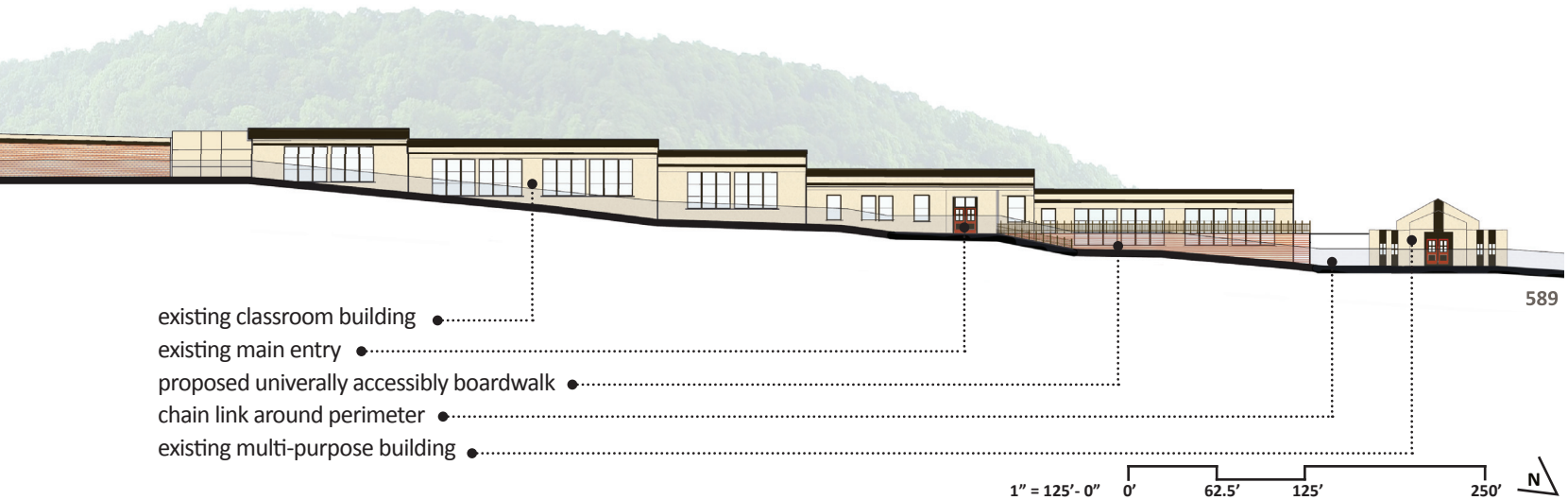


Figure 5.06
MontClair Elementary- Hybrid Learning Landscape Framework Detail Section: Facing Southwest
By Author 2011, adapted from Gould Evans Baum Thornley Architects 2011


589
existing classroom building
existing main entry
proposed univerally accessibly boardwalk
chain link around perimeter
existing multi-purpose building
1" = 125'- 0"
0'
62.5'
125'
250'
N

program: framework elements

"When people have some degree of personal agency- some range of choice about the shape and direction of their own learning activities- learning tends to be more meaningful and robust," (OWP/P Architects, et al. 2010, 66).

Hybrid Learning Landscape Framework

Programmable Elements- Physical Realm

1) Community linkages
    a. Adaptable, Multi-use spaces
    b. Paths and pocket parks
    c. Open Schoolyard
    d. Educational features
2) Link to Existing Curriculum and Core Standards
    a. Provide Multiple learning styles
    b. Age and Development levels continuum
    c. Nature based activities
3) Place based, local activity focus
    a. History
    b. Culture
    c. Natural Features of community and region
4) Circulation, Universal Access and Safety
    a. Minimize vehicle parking and enhance usability of alternative modes
    b. Universal access
5) Play as Learning
    a. functional, physical and symbolic play
6) Monitoring System
    a. display monitors linked to online databases

Table 3.01
Hybrid Learning Landscape Framework
By Author 2011, adapted from CHPS 2007, CHPS 2009 and Brink and Yost 2004

Program elements that were derived from the six programmable principles are seen throughout the following figures. The complete Hybrid Learning Landscape Framework can be found in chapter three on page 27. Non-programmable elements reside in the political realm which is beyond the scope of this project.

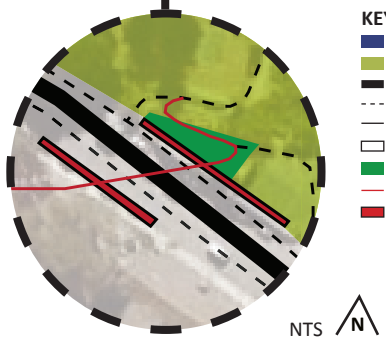
Community Linkages

Context:

a. Paths + Pocket Parks
b. Multi-Use Spaces
- Performance Zone
- Parking/Bioswale
- Lunch + Passive Seating Zones
- Playground/Learning Zones
  - -Active Balance + Climb
  - -Energy Playground
  - -Ohlone History K+1

c. Open Schoolyard
d. Educational Features
- Natural Features
  - -Bioswales
  - -Native Plantings
  - -Urban Farming
  - -Student Garden
- Play as Learning Features
- Monitoring System

Figure 5.07
MontClair Rail Road Trail Extension
By Author 2011, Adapted from Google Maps 2010



KEY
- MontClair Elementary
- MontClair Park
- Roadways
- Pedestrian Pathways
- MontClair Rail Road Trail
- Pedestrain Overpass
- Proposed Pocket Parks
- Proposed MontClair Rail Road Trail Expansion
- Proposed Pedestrian Overpass

Figure 5.08
MontClair Rail Road Historic Overpass- Trail Extension
By Author 2011, adapted from Google Maps 2010

Figure 5.09
MontClair Rail Road Historic Overpass- Bridge Location
Google Earth 2011

About the Design

Introducing a pedestrian overpass where the MontClair Rail Road used to cross creates the opportunity for an extension of MontClair Rail Road Trail and improves pedestrian accessibility and connectivity to MontClair Park and MontClair Elementary. MontClair Rail Road Trail is more likely to be used as an alternative route if it accesses more amenities in the community. Implementing the pedestrian overpass also introduces a historic feature for the community.

Street and pedestrian improvements near the overpass include: removed street parking, incorporation of bicycle lanes, widened sidewalks, community art walls and solar powered safety lighting under the overpass.

Figure 5.10
MontClair Rail Road Trail Crossing Perspective
By Author 2011

Community Linkages

Site:

a. Paths + Pocket Parks
b. Multi-Use Spaces
- Performance Zone
- Parking/Stormwater Treatment Zones
- Lunch + Passive Seating Zones
- Playground/Learning Zones
  - -Active Balance + Climb
  - -Energy Playground
  - -Ohlone History K+1

c. Open Schoolyard
- Gateway Connection to MontClair Park

d. Educational Features
- Natural Features
  - -Stormwater Treatment Zones
  - -Lunch Area Tree Grove
  - -Native Plantings
  - -Urban Farming Zone
  - -Student Garden Zone
- Play as Learning Features
- Monitoring System

About the Design

A gateway that connects MontClair Park and MontClair Elementary creates a sense of entry for the student and community and improves the identity of both properties. The existing access point between the school and park is unexciting and uninviting, creating a weak and placeless experience from one area to the other. Introducing the recycled PVC themed gateway area also serves as an activity and teaching tool for the school.

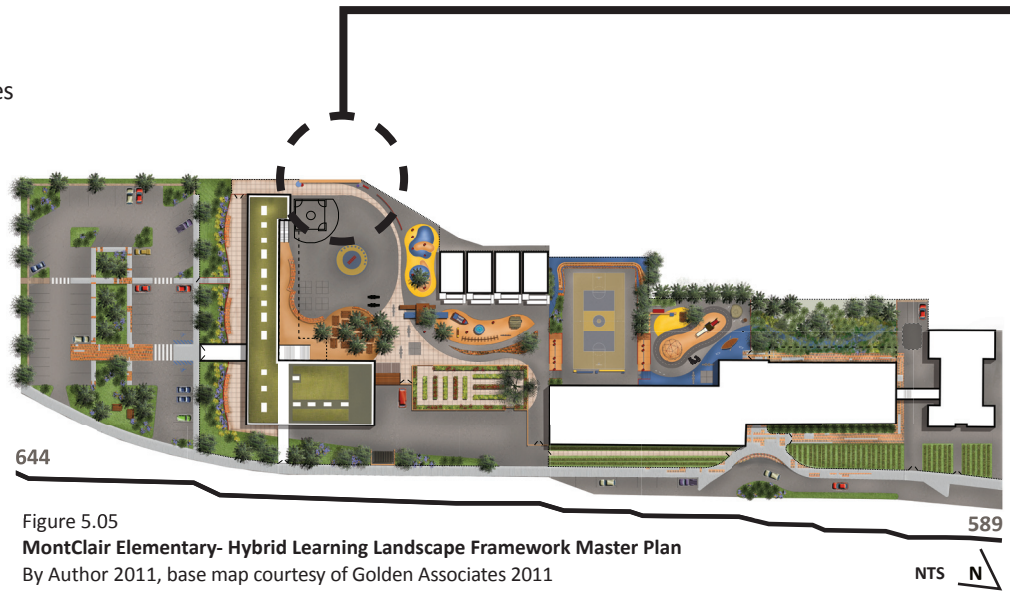


Figure 5.05
MontClair Elementary- Hybrid Learning Landscape Framework Master Plan
By Author 2011, base map courtesy of Golden Associates 2011

Figure 4.12
MontClair Park + Elementary School Existing Link
Courtesy of Jim Ryugo 2011

Figure 5.11
MontClair Park and Elementary School Gateway Perspective
By Author 2011

Community Linkages

Site:

a. Paths + Pocket Parks
b. Multi-Use Spaces
- Performance Zone
- Parking/Stormwater Treatment Zones
- Lunch + Passive Seating Zones
- Playground/Learning Zones
  - -Active Balance + Climb
  - -Energy Playground
  - -Ohlone History K+1

c. Open Schoolyard
- Gateway Connection to MontClair Park

d. Educational Features
- Natural Features
  - -Stormwater Treatment Zones
  - -Lunch Area Tree Grove
  - -Native Plantings
  - -Urban Farming Zone
  - -Student Garden Zone
- Play as Learning Features
- Monitoring System

About the Design

Renovation of the parking lot involves grading the south corner of the lot to become level with the existing lot and incorporating a retaining wall. The parking lot will serve as a multi-use space, incorporating 72 regular stalls, 2 universally accessible stalls, bioswale and stormwater treatment area, pocket park and providing access to the tennis courts and proposed classroom building. The goal of the renovated parking lot is for it to become a destination and provide a positive experience for people in contrast to the typical placeless parking lot.

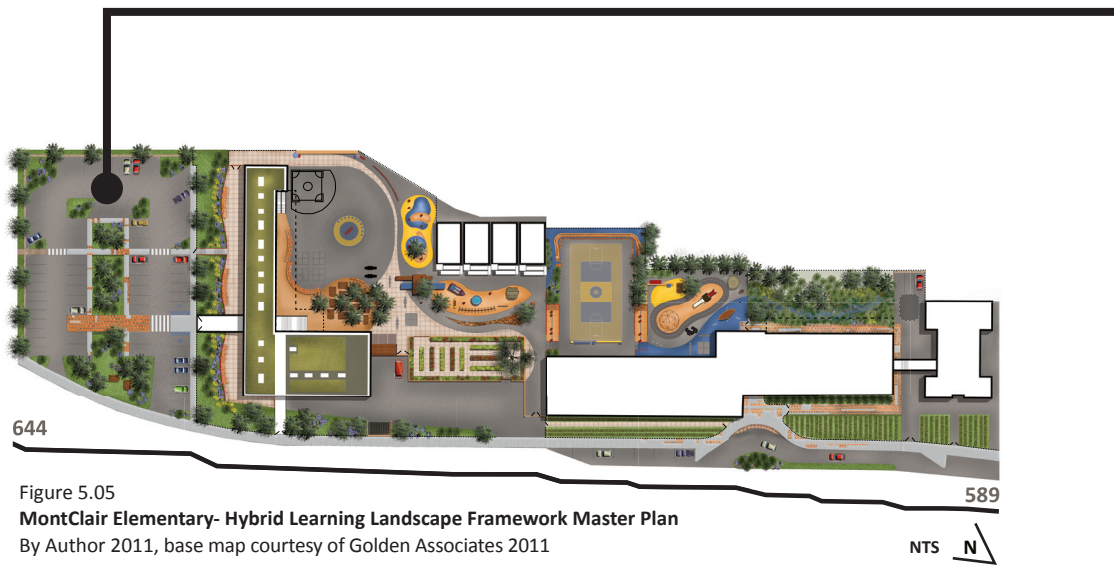


Figure 5.05
MontClair Elementary- Hybrid Learning Landscape Framework Master Plan
By Author 2011, base map courtesy of Golden Associates 2011

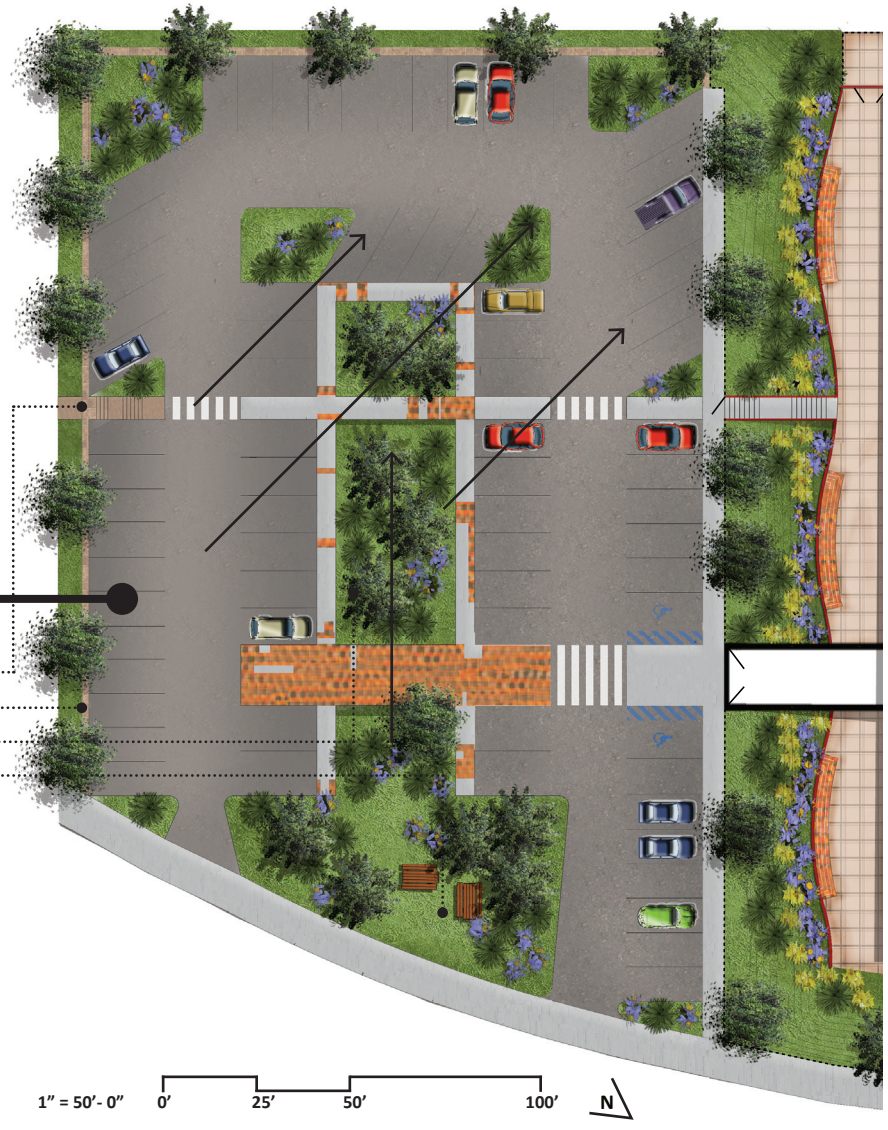


Figure 5.12
Parking Lot Detail Plan
By Author 2011

Link to Existing Curriculum and Core Standards

Existing curriculum and Core Standards research accessed from (Sacramento County Office of Education 2011) and (MontClair Elementary 2010)

- Visual + Performing Arts
  - Performance Zone
    - -Amphitheater + Stage
- Math
  - Student Garden Zone
  - Active Balance + Climb Zone
  - Outdoor Classroom
  - Stormwater Treatment Zone
- English/Language Arts/World Language/Library
  - Site as Inspiration for writing/art
  - Passive Seating Area
  - Lunch + Passive Zone
  - Outdoor Classroom with Seating
- Science
  - Energy Playground Zone
  - Student Garden Zone
  - Stormwater Treatment Zones
- History/ Social Science
  - Ohlone History K+ 1 Zone
- Health + Physical Education
  - Student Garden Zone
  - Urban Garden Zone
  - Outdoor Classrooms
  - Playground/Learning Zones
    - - Energy Playground Zone
    - - Active Balance and Climb Zone
    - - Ohlone History K + 1 Zone
- a. Provide Multiple Learning Styles
- b. Age + Development Level Continuum
- c. Nature based Activities
  - Stormwater Treatment Zones
  - Lunch Area Tree Grove
  - Native Plantings
  - Urban Farming Zone
  - Student Garden Zone

Figure 5.13
Performance Zone Detail Plan
By Author 2011

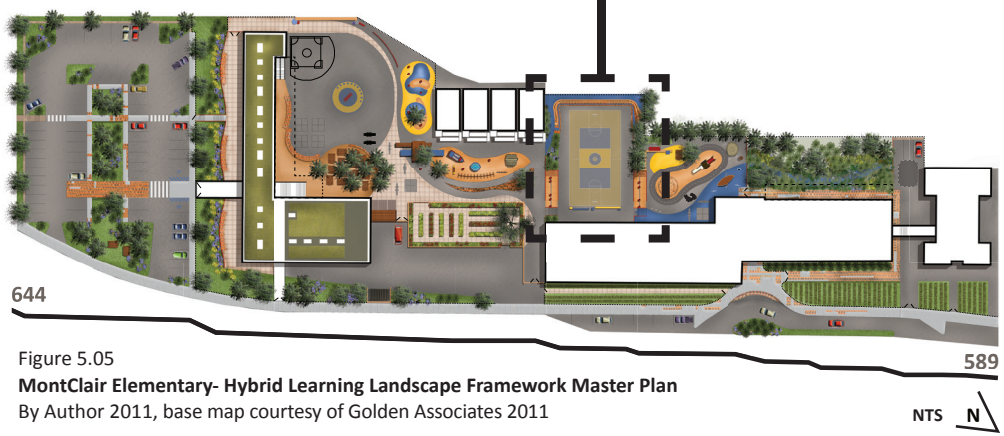


Figure 5.05
MontClair Elementary- Hybrid Learning Landscape Framework Master Plan
By Author 2011, base map courtesy of Golden Associates 2011

About the Design

The performance zone is an adaptable space that addresses the inaccessible terracing of the playground while allowing space for a wide range of student and community activities. Universally accessibly ramps that run parallel to a terraces connect the energy playground, performance zone and the Ohlone History K+1 Zone (refer to figure 5.13).

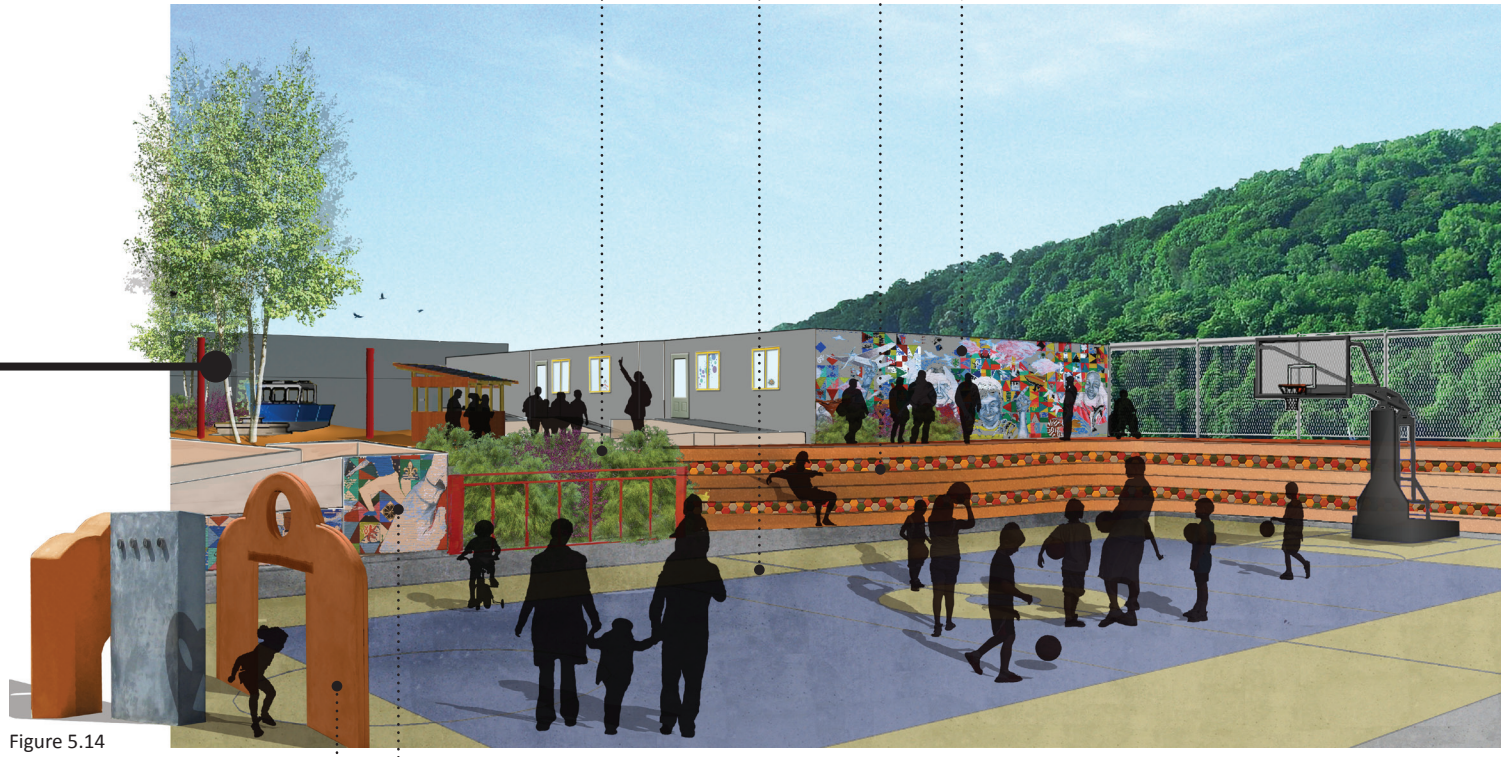


Figure 5.14
Performance Zone Perspective
By Author 2011

Place based, local activity

a. History
- Ohlone History K+ 1 Zone

b. Culture
- Recycle Area
- Energy Playground Zone
- Asphalt Kickball Field Zone
- Performance Zone
  - -Amphitheater
  - -Basketball Court
  - -Stage Elements
- Urban Farming Zone
- Student Garden Zone

c. Natural Features of Community and Region
- Stormwater Treatment Zones
- Lunch Area Tree Grove
- Native Plantings
- Urban Farming Zone
- Student Garden Zone
- Pocket Park

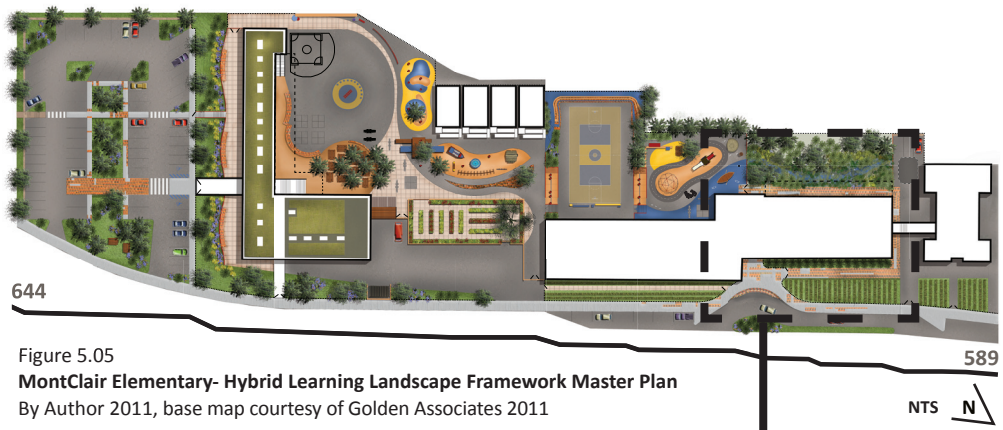


Figure 5.05
MontClair Elementary- Hybrid Learning Landscape Framework Master Plan
By Author 2011, base map courtesy of Golden Associates 2011

Circulation, Access and Safety

a. Minimize vehicle parking and enhance usability of alternative modes
- Parking
- Bicycle + Skateboard Racks
- Gateway Connection to MontClair Park

b. Universal access
- Entry Drop-Off/Pick-Up Court
- Universally Accessible Boardwalk

Figure 5.15
Bioswale and Boardwalk Detail Plan
By Author 2011

About the Design

The universally accessible boardwalk, made of recycled plastic lumber, provides an accessible route from the existing classroom building's front entry to the Ohlone History K+1 Playground (refer to Figure 5.15). The bioswale serves as an educational feature for students and the community, teaching about stormwater management with native plantings. The boardwalk and shade structure are not attached to the existing classroom building do to structural regulations.

Figure 5.16
Bioswale and Boardwalk Perspective
By Author 2011

Figure 4.15
Existing Building + Asphalt Terracing
By Author 2011

Play as Learning

a. Functional, Physical and Symbolic Play
- Active Balance and Climb Zone
- Energy Playground Zone
- Student Garden Zone
- Performance Zone (Amphitheater, Basketball Court and Stage Elements)
- Ohlone Indian History K+1 Zone
- Shadow Sundial

About the Design

The lunch area tree grove provides an area where students and teachers can eat lunch or rest. Visual connection is maintained through the tree grove to provide added safety for the playground and kickball field areas. The active balance and climb zone provides activities to experiment with physical skills while engaging in social play.

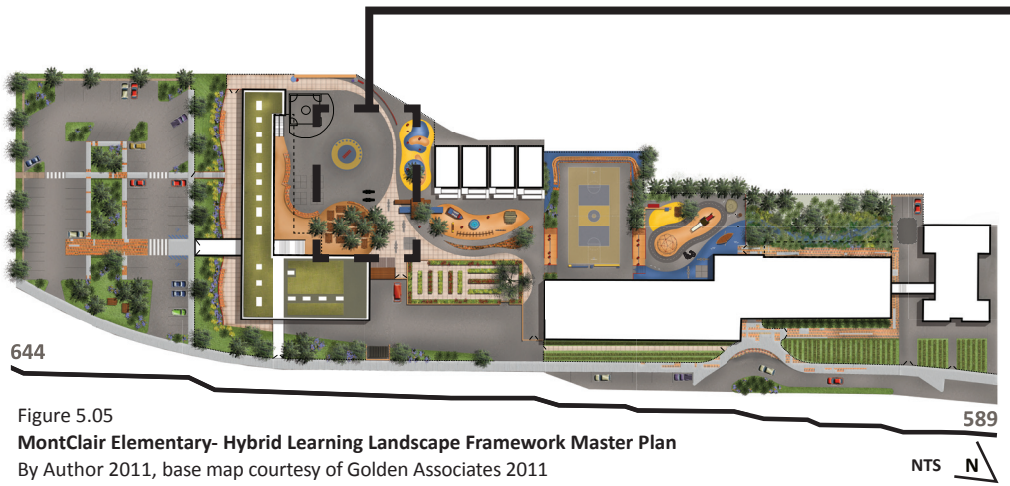


Figure 5.05
MontClair Elementary- Hybrid Learning Landscape Framework Master Plan
By Author 2011, base map courtesy of Golden Associates 2011

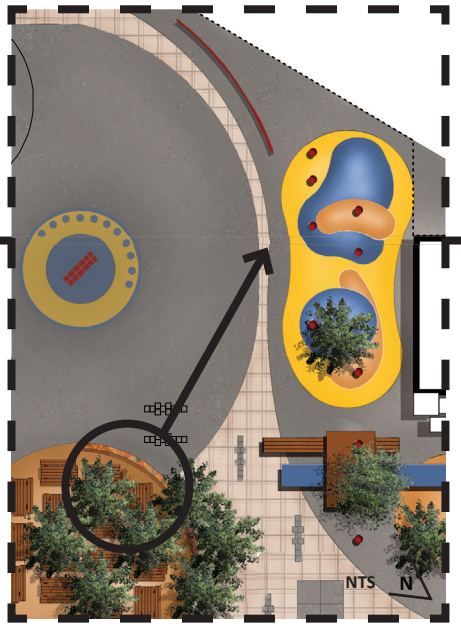


Figure 5.17
Active Balance and Climb Zone Detail Plan
By Author 2011

Figure 5.18
Active Balance and Climb Zone Perspective From Lunch Area Tree Grove
By Author 2011

Play as Learning

a. Functional, Physical and Symbolic Play
- Active Balance and Climb Zone
- Energy Playground Zone
- Student Garden Zone
- Performance Zone (Amphitheater, Basketball Court and Stage Elements)
- Ohlone Indian History K+1 Zone
- Shadow Sundial

About the Design

The Ohlone Indian History K+1 Playground is universally accessible and offers a play and learning experience for all ages. The space focuses on the highly imaginative minds of Kindergarten and first grade students, as well as beginner level physical activity and socially engaging play.

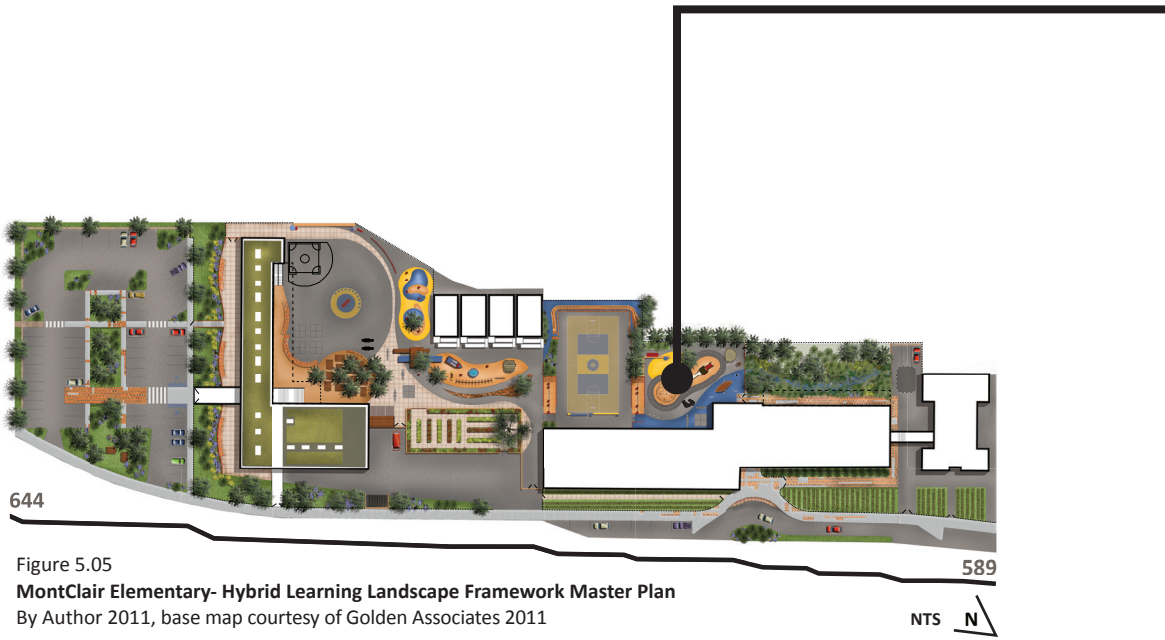


Figure 5.05
MontClair Elementary- Hybrid Learning Landscape Framework Master Plan
By Author 2011, base map courtesy of Golden Associates 2011

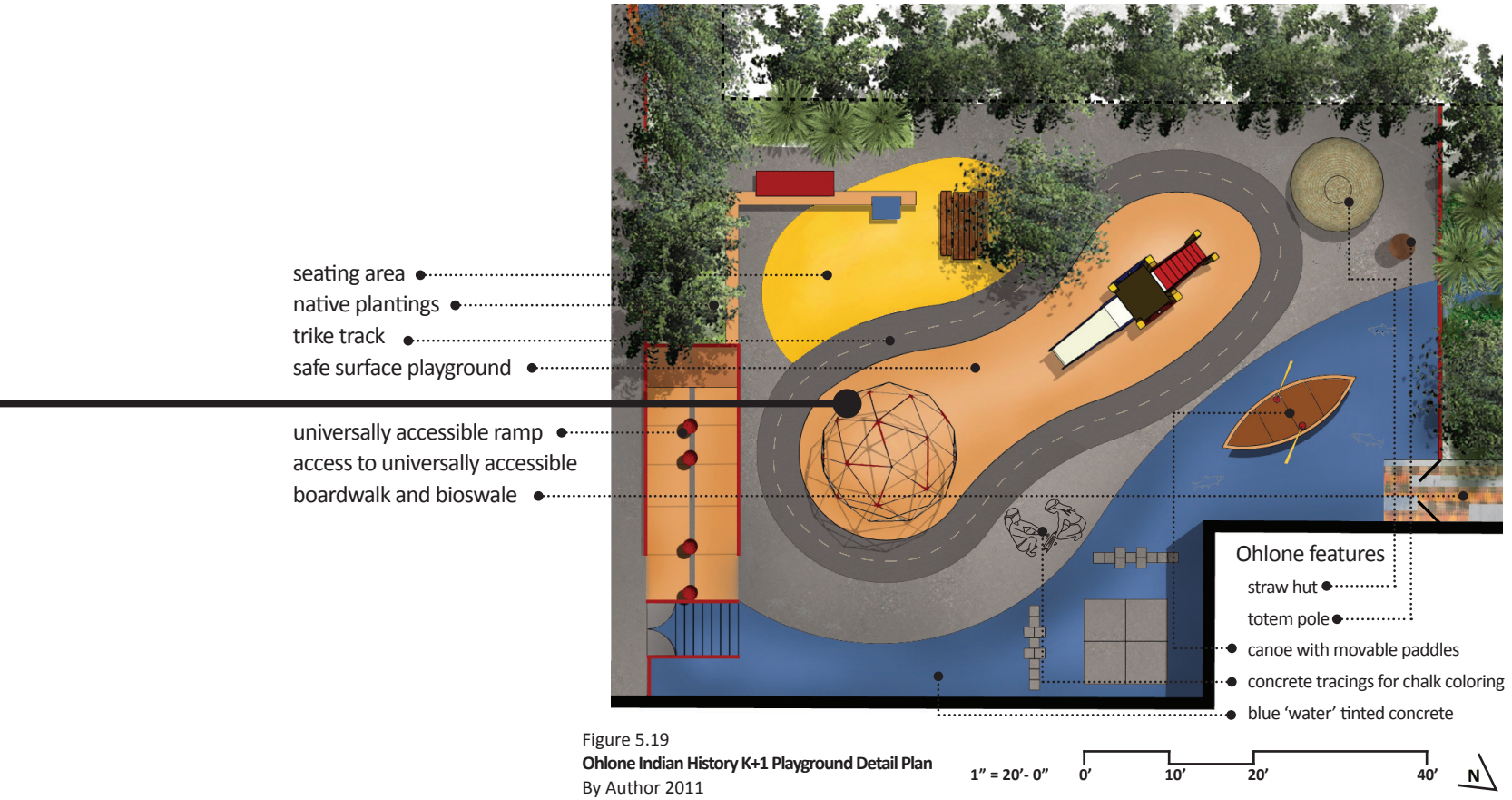


Figure 5.19
Ohlone Indian History K+1 Playground Detail Plan
By Author 2011

Monitoring Program

a. display monitors linked to online databases
- CHPS Educational Display Board
- Energy Generating Playground Monitor
- Carbon Emissions- Carpooling
- Catchment System Monitoring

About the Design

The energy playground and monitoring system was designed to reconnect students with energy production, storage and use. The energy playground harvests energy generated by children's normal play activities and releases it in different ways to teach the principles of energy transfer. The monitoring system keeps track of how much energy is generated over a designated period of time. Inspiration came from (The FunTheory 2009).

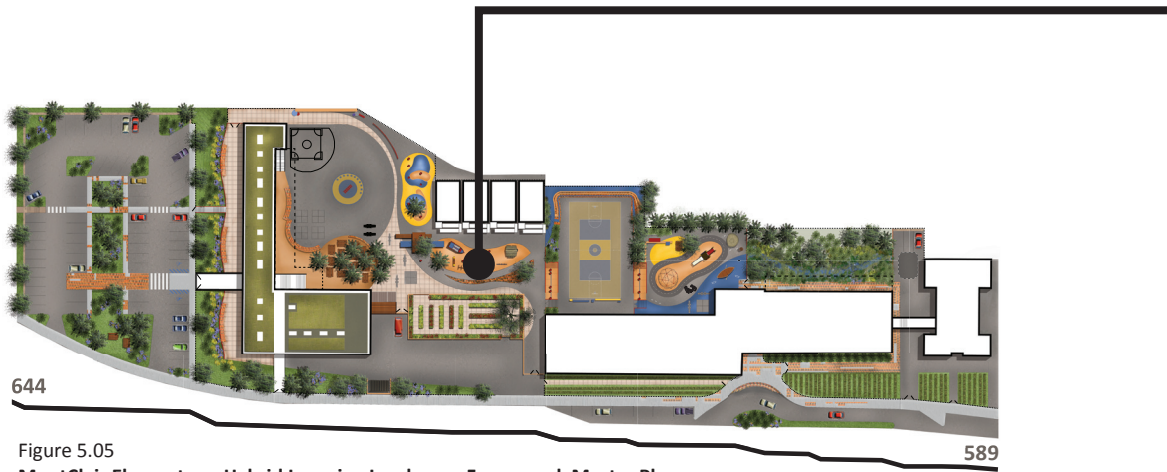
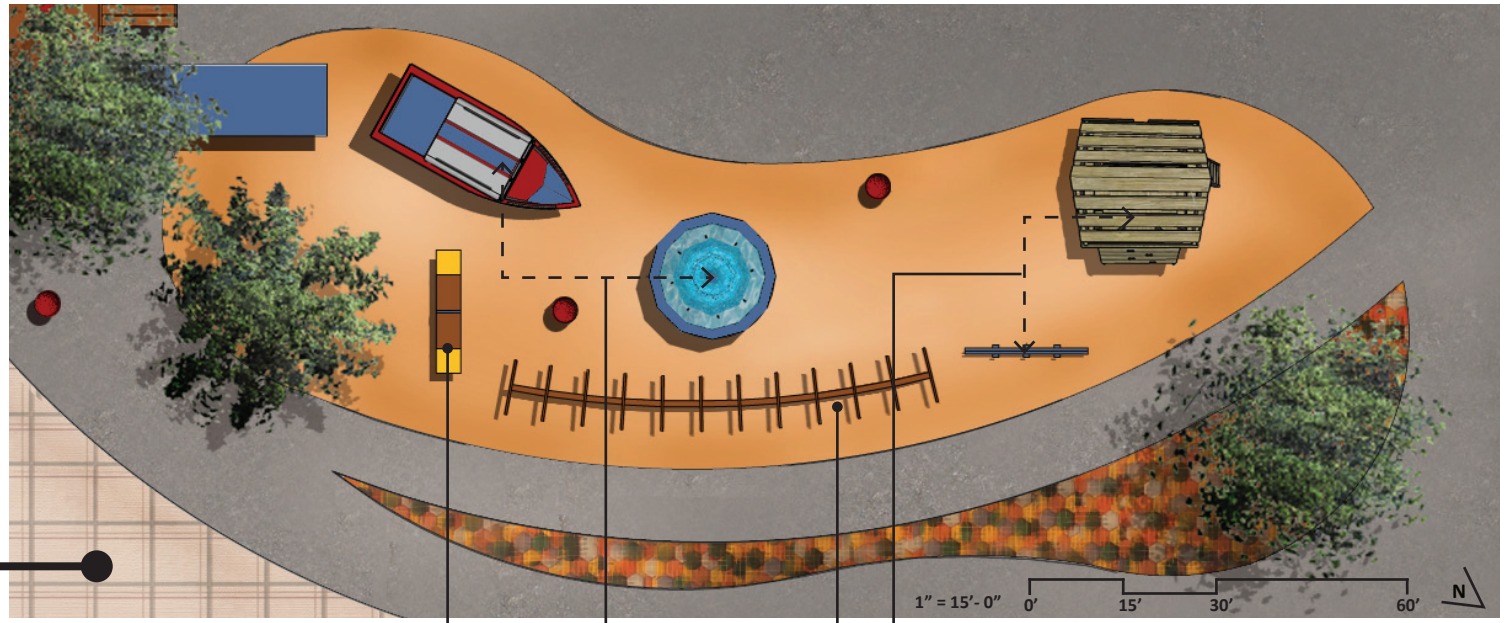


Figure 5.05
MontClair Elementary- Hybrid Learning Landscape Framework Master Plan
By Author 2011, base map courtesy of Golden Associates 2011



Running on the log roll powers a light in the clubhouse.

A monitoring system under the trellis keeps track of energy generation.

The boat pumps filtered gray water from proposed building to the upper reservior of fountain by use of handles. The upper reservior can then be released for a water and music show.

The seesaw stores energy as compressed air. When enough builds up, it is released through whistles.

Figure 5.20
Energy Playground + Energy Monitoring Detail Plan
By Author 2011, idea adapted from (The Fun Theory 2009).

06

evaluation and conclusions

Figure 6.01
Tree from Chalk Art Extravaganza
Streeter 2010

evaluate + score

"When going back makes sense, you are going ahead," (Berry 1981, 195).

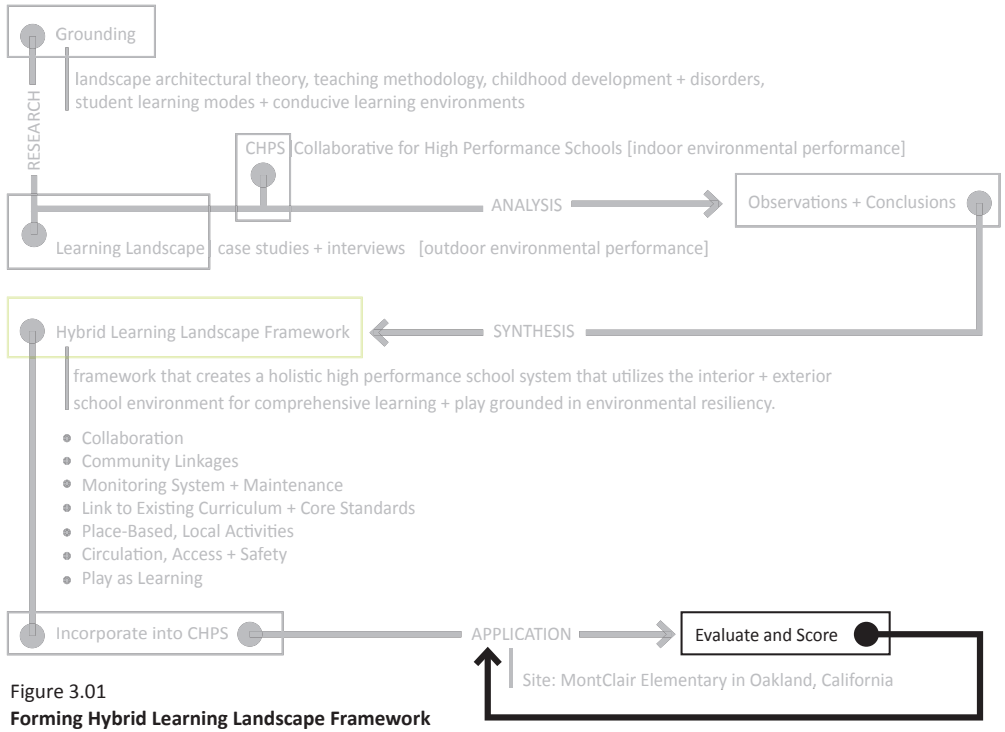


Figure 3.01
Forming Hybrid Learning Landscape Framework
By Author 2011

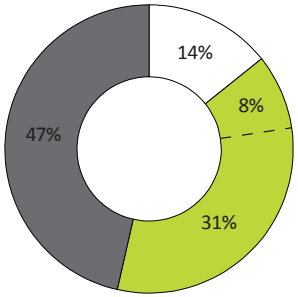
After Hybrid Learning Landscape Framework was applied to MontClair Elementary the site design was evaluated and scored based on the CHPS adapted scorecard for *New Buildings on an Existing Campus*.

The proposed fall 2011 site plan for MontClair Elementary is seeking to reach 54 points out of 118 attainable points (46%) on the existing CHPS scorecard for the development category *New Buildings on an Existing Campus*.

Through the suggested scorecard improvements they could reach 109 out of 160 attainable points (68%). By working with the architect and school officials on the Hybrid Learning Landscape Framework master plan, a full 100 percent of the scorecard could be achieved by improving on building credits as well as landscape credits. Refer to Appendix f, page 114 for detailed scorecard improvements.

Land Use Analysis

Comparing the proposed fall 2011 site plan with the Hybrid Learning Landscape Framework plan for MontClair Elementary reveals improved land use. The Hybrid Learning Landscape Framework Master Plan reduces asphalt by ten percent, increases accessible green space by seven percent and increases inaccessible green space by three percent by adding a portion of green roof to the proposed plan. Site trees more than doubled. Refer to Figures 4.10 and 6.02 below.



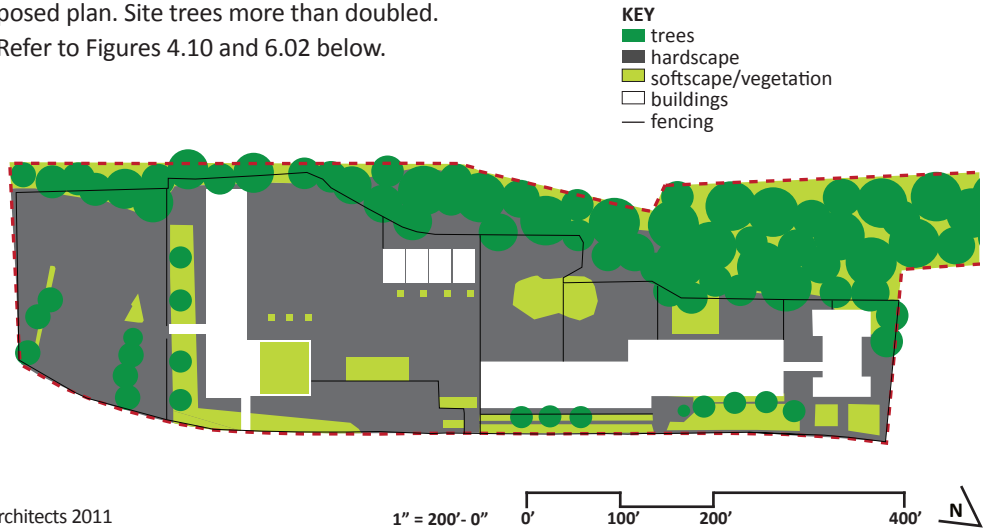
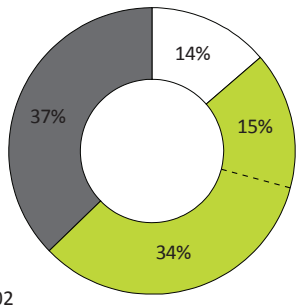


Figure 4.10
Proposed Fall 2011 Site Plan- Land Use
By Author 2011, adapted from Gould Evans Baum Thornley Architects 2011



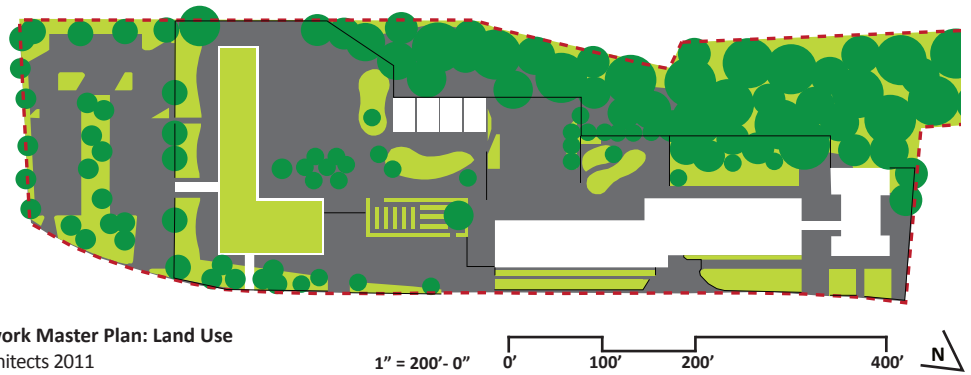


Figure 6.02
MontClair Elementary- Hybrid Learning Landscape Framework Master Plan: Land Use
By Author 2011, adapted from Gould Evans Baum Thornley Architects 2011

project conclusions

"If process drives outcomes, we may not know where we are going, but we know we want to be there," (Mau 1998).

During a summer internship with Golden Associates I worked on the MontClair Elementary site redesign project from May to August of 2011. I participated in conceptual bioswale and student garden design, attended collaboration meetings at the school and continued to develop design until the completion of my internship. Through my experiences, I became interested in Learning Landscapes and the use of exterior school environments for comprehensive learning. After returning to Kansas State University to finish my last year of graduate school, I decided to study the topic and use MontClair Elementary to apply my research findings through design application. Project conclusions are a result of project reflection and thinking towards the future of Hybrid Learning Landscape Framework.

Overall, Hybrid Learning Landscape Framework provided a starting point for transforming MontClair Elementary into a holistic high performance school system that utilizes the interior and exterior school environment for comprehensive learning and play.

Through Hybrid Learning Landscape Framework, the CHPS program better represents a holistic high-performance school system by improving upon the existing scorecard, suggesting improvements to the *School as a Learning Tool* section and proposing the *Continued Verification* section.

There could be a stronger link to existing curriculum through design that could be achieved by collaboration with faculty of MontClair Elementary. Distance to the site and time limitations restricted further development of curriculum linkages.

Hybrid Learning Landscape Framework could have been applied in greater depth through design detailing and material selection, but was not due to time limitations. Further study and development would improve the aesthetic experience and uniqueness of place.

Budget is the number one determining factor in establishing Hybrid Learning Landscape Framework at MontClair Elementary. The design is meant to be a framework that changes over time, so the site can adjust according to the features the budget will allow. I propose the bioswale and student garden areas be implemented first, because of their immediate curriculum linkages and desire to be implemented by the school. The master plan generated during this project aims to draw funding from outside sources so the full plan can be implemented over time.

07 references

Figure 7.01
Playground Climber
(Hogan, 2011)

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08 appendices

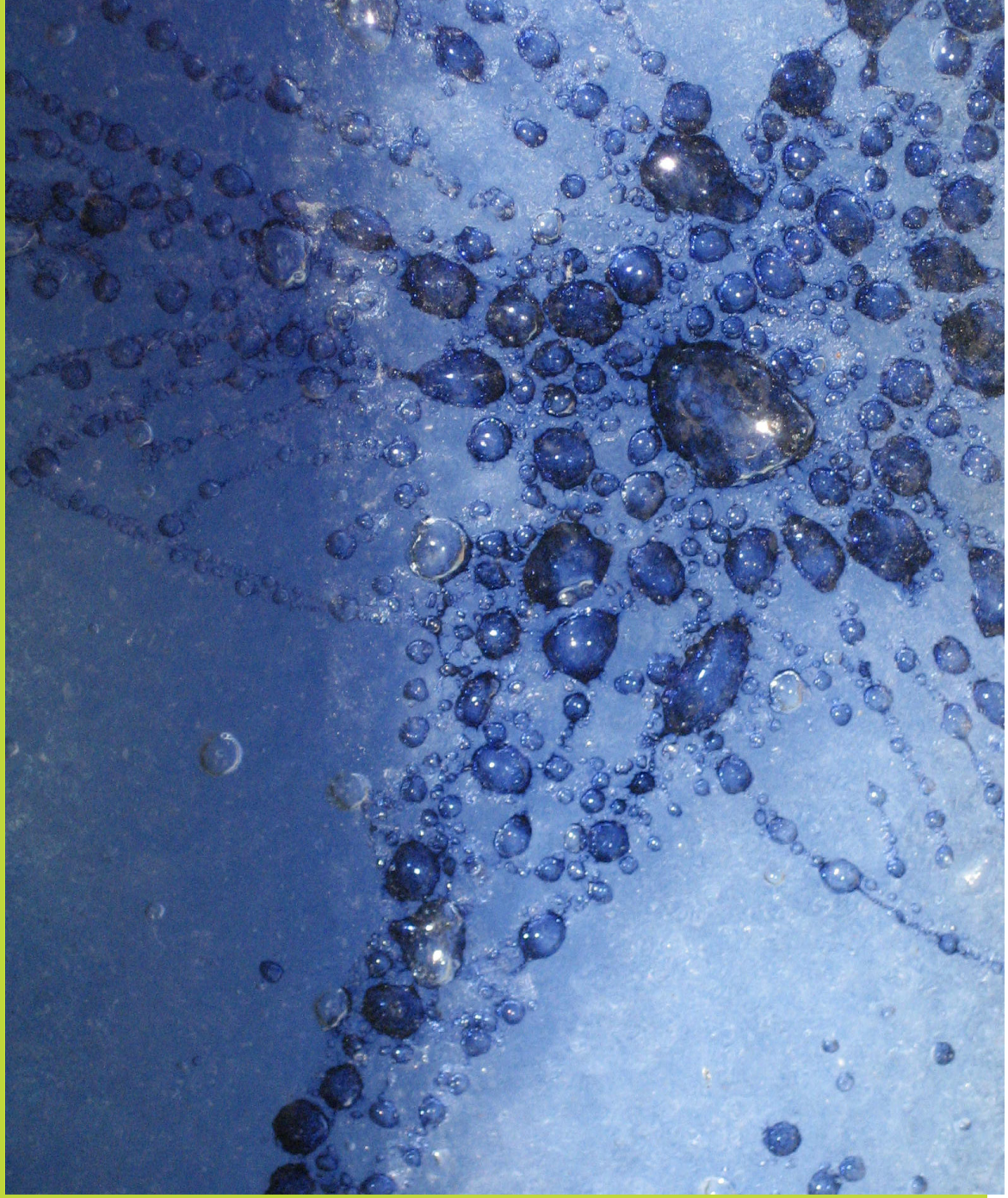


Figure 8.01
Firefly Detail in Tanner Park, Portland, Oregon
By Author 2010

appendix a

process

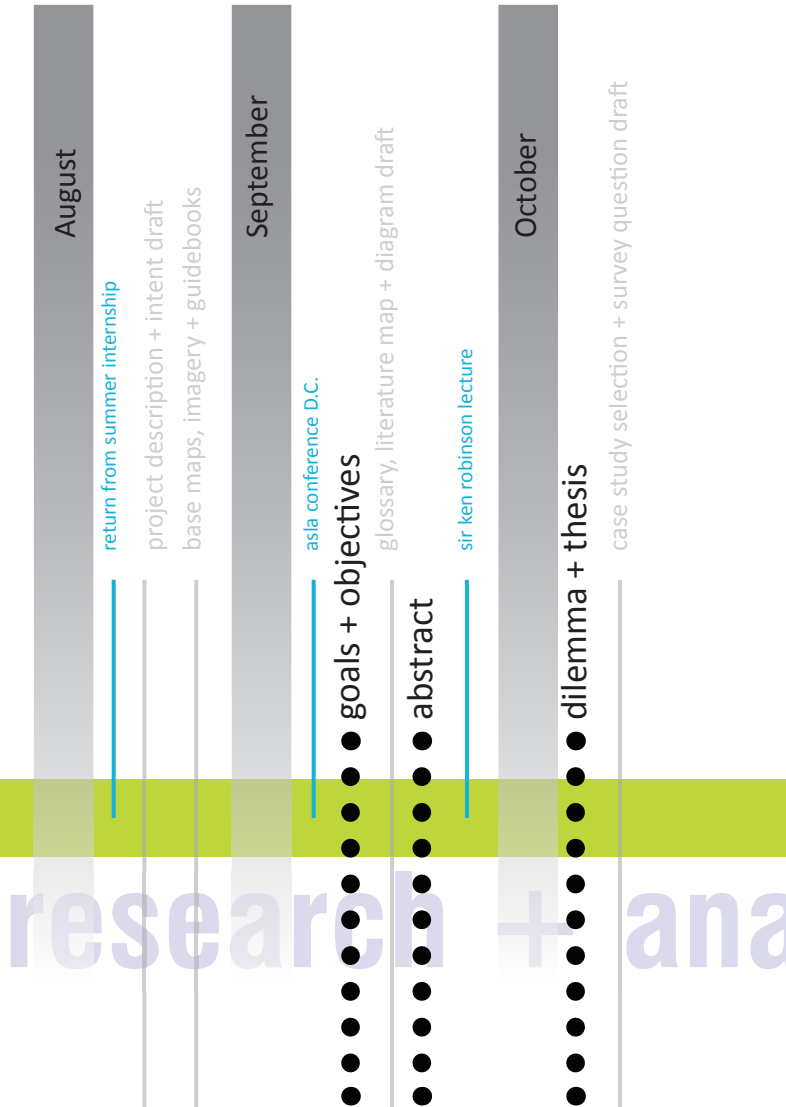


Figure 8.02
Process Diagram
By Author 2011

"Diagrams do not themselves produce form...but rather [they] emit formative and organizational influence, shapegiving pressures that cannot help but be 'embodied' in all subsequent states of the given region of concrete reality in which they act," (Corner 1999, 166).

analysis

application + synthesis

November

defining learning landscape

site program draft

committee meeting

case studies inventory, analysis + synthesis

thanksgiving break (refine working documents)

site inventory + analysis

December

christmas break (refine working documents)

site program + possibilities

final semester document

January

missing material

storyboard

pre-design [brainstorm + creative thinking]

document design

February

conceptual design

refine concepts

mid crit

evaluate [solve dilemma and align with thesis?]

design development- production

case study inventory + analysis draft

glossary

document annotated outline

March

literature review

bibliography

spring break

substantial completion

April

document final text

final product (pdf + powerpoint)

final defense

May

ballot due to graduate school

graduation

appendix b

glossary

According to Elaine Brooks, "People are unlikely to value what they cannot name," (Louv 2008, 41).

Collaborative for High Performance Schools (CHPS)

A growing, nationally recognized, California based organization dedicated to a building a new generation of high performance schools that focus on the financial, health and student performance of schools (adapted from CHPS 2007, Geers and Dekovic 2009).

Environmental Resilience

"The ability of a system to adapt and adjust to changing internal or external processes," (Hill 2005, 143). [Environmental Resilience] seeks to maximize the efficiency and relationship between the ecological, social, cultural and economic systems of a site, creating an enhanced understanding
and relationship between natural processes and human activity (Sullivan 2010).

Howard Gardner's Multiple Intelligences Theory

Howard Gardner's Multiple Intelligences Theory responds to the way in which people solve problems and learn tasks. The seven intelligences include linguistic, logical-mathematical, musical, bodily-kinesthetic, spatial-visual, interpersonal, and Intrapersonal. Designing for multiple intelligences asks designers to create variety in learning spaces including diverse sizes, materials, and colors, as well as spaces with different transparency, connectivity, and agility (OWP/P Architects, et al. 2010).

Hybrid Learning Landscape Framework

A framework that creates a holistic high performance school system that utilizes the interior and exterior school environment for comprehensive learning and play grounded in environmental resiliency.

Learning Landscape

Outdoor student learning environment that serves the school and community as a curriculum based learning tool, playground, social gathering area and park (adapted from Brink and Yost 2004).

Multiple learning styles

Multiple Learning Styles refers to the different ways children learn. Multi-sensory exploration and discovery goes beyond hearing and seeing and reaches five other [non-traditional] ways children learn. There are seven senses (physical receptors) that directly link the human body to the surrounding world which ensures comprehension through compound layers of experience that activates more than one of the senses (Kanics OTR/L 2010).

Nature-Deficit Disorder

Nature-deficit disorder describes the human costs of alienation from nature, among them: diminished use of the senses, attention difficulties and higher rates of physical and emotional illnesses (Louv 2008).

Universal Design

Universal design, according to Ron Mace, is the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design (North Carolina State University, 2008).

appendix c

case studies inventory

"There are many vessels in nature, lots of sacs and other kinds of containers, but only humans make boxes," (Luebkeman 2006, 7).

Choosing Representative Case Studies

Two case studies, Steele Elementary and Edison Elementary, were chosen based on links to learning landscape objectives, scale of site and student population similarities with the Learning Landscape testing site: MontClair Elementary. The purpose of each case study was to inventory and analyze the school's land use, program elements, goals, background, demographics, context, design intent, schoolyard link to curriculum, funding, maintenance and other aspects in order to make observations about effective and ineffective learning environments planned through Learning Landscapes. The results and conclusions aided in forming Hybrid Learning Landscape Framework.

Location + Context

Steele Elementary is located at 320 S. Marion Parkway in Denver, Colorado on the corner of Alameda Avenue and Marion Parkway. The surrounding neighborhood is mostly residential, with a large park, retail spaces, restaurants and everyday conveniences. The learning landscape project for Steele Elementary was initiated in 2006, making the current landscape 5 years old.

Goals

- Improve age-appropriate and safe play opportunities.
- Further enhance hands-on learning through all senses.Create opportunities to broaden global cultural knowledge.
- Celebrate the historical significance of the school
- Create sustainable landscapes that are low maintenance

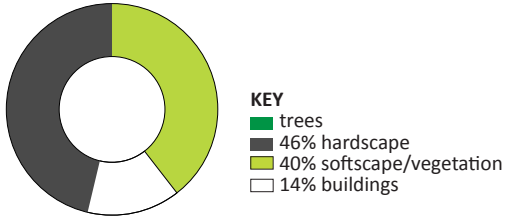
(Thompson and Brink 2005)

Program Elements

<u>learning</u>

outdoor classroom w/shade structure
community garden
student garden (orchard, vegetables, herbs, compost)
sundial and zodiac tiles
northern hemisphere - constellations
astronomical timeline

Figure 8.03
Steele Elementary Master Plan
Courtesy of Davis Partnership 2006



<u>play/other</u>

Kindergarten playground
grade 2-5 playground
basketball court
athletic field
hopskotch
teatherball
4 square (seasons, time and butterfly life cycle)
banners

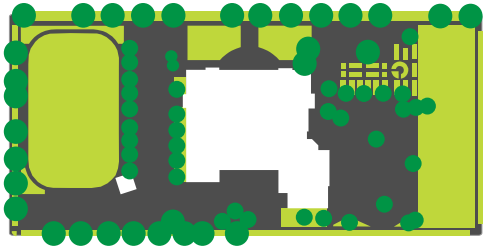


Figure 8.04
Steele Elementary Land Use
By Author 2011, adapted from Davis Partnership 2006

Figure 8.05
Steele Elementary Before and After Construction
By Author 2011, adapted from Nowak 2011

Location + Context

Edison Elementary is located at 3350 Quitman Street in Denver, Colorado on the corner of West 35th Avenue and Perry Street. The surrounding neighborhood is residential and is located about four blocks from downtown Denver. The learning landscape project for Edison Elementary was initiated in 2004, although it has only been completed for 2 years.

Goals

Serve as a source of inspiration, invention and creativity that celebrates the human legacy of curiosity and learning through landscape revealing natural sciences, math, literature and art.

Themed areas will emphasize different skills and enhance Edison Elementary curriculum. (UCD 2008)

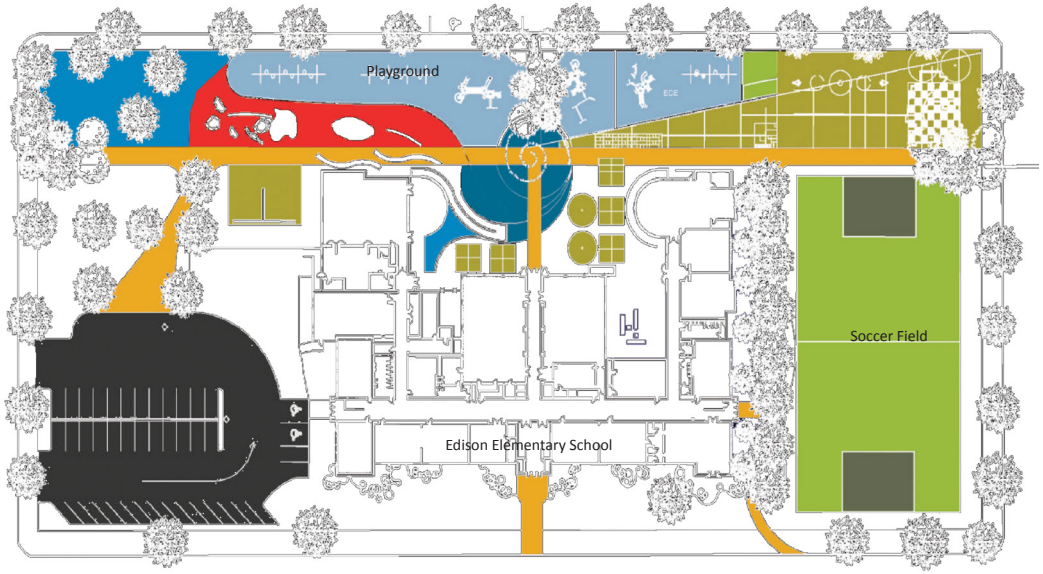


Figure 8.06
Edison Elementary Master Plan
Courtesy of UCD 2008

Program Elements

shade and entry structure
community garden
student garden and orchard
xeriscape herb beds
signage and banners
benches and picnic tables
play equipment
soccer field
basketball courts
4 square and teather ball
sculpture
garden themes
(high plains, texture, micro-climate, color and turf)
amphitheater

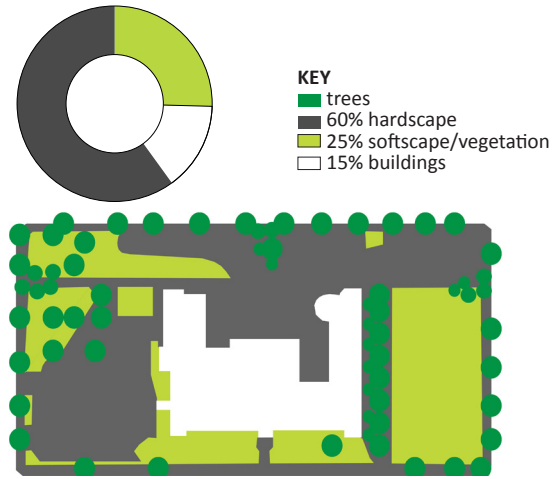


Figure 8.07
Edison Elementary Land Use
By Author, adapted from UCD 2008

Figure 8.08
Edison Elementary Before and After Construction
By Author 2011, adapted from UCD 2008

appendix d

case studies survey analysis

"In planetary terms, we're all downstream,"
(McDonough and Braungart 2002, 127).

Choosing a School Representative

After the case study schools were chosen, a representative from each school's learning landscape program was selected based willingness to participate in my research and strong role with the learning landscape. The representative was asked a series of questions over the phone regarding the project background, design intent, integration with curriculum, funding, maintenance and other aspects.

Voluntary School Representatives

Andy Nowak- volunteer of Slow Food Denver working with the garden at Steele Elementary

Kelly Mansfield- Art teacher at Edison Elementary

* Special thanks to Andy Nowak for providing valuable feedback and suggestions on the organization of the survey questionaire.

Background, Demographics + Context

What is your role with the learning landscape?

STEELE ELEMENTARY- Began as parent of school, but now a full time volunteer and co-leader of Seed to Table Garden Program through Slow Food Denver. Head volunteer at Steele (with Seed to Table Garden Program) for ten years, teaches classes about the garden component of the learning landscape (with volunteer parent engagement) and advises parent groups from other schools with their gardens.

EDISON ELEMENTARY- ECE (Early Childhood Education) through 5th grade Art Teacher

How do you define learning landscape?

STEELE ELEMENTARY- "We use the term "learning landscape" to refer to the entire school yard (playground, athletic field, shade structure, banners, and special components like gardens, sun dials, statues, etc.) and the learning and physical activity opportunities that were created."

EDISON ELEMENTARY- Our learning landscapes is a community garden where the intention is to connect the community with the surrounding school and to teach kids where their food comes from. The school plots help feed the school cafeteria salad bar.

What program elements make up the learning landscape?

STEELE ELEMENTARY- constellations in concrete, zodiac tiles, astronomical time line in sidewalk, sundial, playgrounds, athletic field, basketball court, 4 square, teatherball, shade structure, banners, gardens, compost area, sundial, statues

EDISON ELEMENTARY- shade and entry structure, community garden, student garden, xeriscape herb beds, small orchard, signage and banners, benches, picnic and game tables, play equipment, soccer field, basketball courts, 4 square, tether ball, sculpture, garden themes (high plains, texture, micro-climate, color and turf), amphitheater. Kindergarten through 1st grade use part of the garden for sensory experience and for the after school poetry program. Parents are in charge of organizing the after school programs and sometimes they hire outside people to come in and organize programs. Parents fund the programs.

What is the neighborhood like? What surrounds the school?

STEELE ELEMENTARY- high economic neighborhood- UCD claims that nicely developed schoolyards attract people that take care of things which decrease vandals. Also, the engagements of the community in the development-people who invest their time and effort- help develop a new perception of the space and vandalism will likely decrease. But, don't expect that to always be the case. School is surrounded by residential development; city park 2 blocks south (contains 2 lakes, 2.5 mile running trail, open space and amphitheater). High rise apartments 1 block south, Alameda Street to the north is the only busy street.

EDISON ELEMENTARY- middle class urban residential neighborhood, school is about four blocks from downtown Denver. The neighborhood has a strong Hispanic

background but has become gentrified over the years. The neighborhood is constantly changing.

What is the student and teacher population?

STEELE ELEMENTARY- 450 students, 25 teachers, 18 classrooms

EDISON ELEMENTARY- 568 students, 37 teachers

How do students get to school?

STEELE ELEMENTARY- PE teacher developed a bike club and PTA purchased racks. Bike traffic is on roadway. Bike to work/school days had over 100 kids participate. Only 2 buses that carry less than 50 kids, rest of students ride with parents, walk or bike to school. Most kids come from the south and cut through the park.

EDISON ELEMENTARY- Half the students are driven and half walk. The neighborhood has great sidewalks and is easily accessible to walk to school.

Design + Intent

How was the learning landscape initiated?

STEELE ELEMENTARY- Joint effort between University of Colorado-Denver's Learning Landscape Program and Denver Public Schools- goal for all DPS to have learning landscape- Steele project was initiated in 2006. DPS wrote and received the bond, UCD provided master student for design.

EDISON ELEMENTARY- a group of parents sought out a grant to start a community garden and the UCD provided guidance and a masters student designer

Describe the design process like? Who was involved?

STEELE ELEMENTARY- UCD Master's student took the learning landscape school project as part of class and lab work. She worked with students, teachers, principal, parents and staff.

EDISON ELEMENTARY- general parents and two parents that are Landscape Architects connected with Denver Urban Gardens who are dedicated to working with Denver Public Schools

How old is your learning landscape?

STEELE ELEMENTARY- student and community garden has been in existence before learning landscape was implemented, but learning landscape is 5 years old

EDISON ELEMENTARY- initiated in 2004 but completed for two years

How would you describe your school learning landscape?

STEELE ELEMENTARY- Two main themes: Outer space and garden. Outer space- only planetarium in district with space elements in learning landscape- constellations in concrete, astronomical time line in sidewalk, sundial. Garden- compost area, student garden with vegetables, herbs and orchard and new greenhouse

EDISON ELEMENTARY- Community garden with about 30 private plots that families and neighbors rent to grown their own vegetables. There are five raised beds, one for each grade at the elementary school that is used for teaching science, art and writing. There is also a small orchard of fruit trees. The garden is full of butterflies, dragonflies and birds. There are also sensory walks through garden with kindergartners and xeriscape herb beds. The design was supposed to look like a sun with rays branching off it.

Who uses the learning landscape?

STEELE ELEMENTARY- K-5 students (all 18 classrooms), Girl Scouts troop adopted herb plot in garden, weekends-families (one of learning landscape goals is for the landscape to be open to everyone 24/7. Community garden next to school garden- mostly young and retired family use from surrounding neighborhood

EDISON ELEMENTARY- community gardeners, teachers, ECE- 5th grade students and families. Families often walk through the path on their way to school.

Do the school facilities and learning landscape provide universal access (ADA)?

STEELE ELEMENTARY- no ADA kids attend school. Garden is wood chips but could accommodate for ADA in future, new greenhouse is ADA compliant inside and paths are crushed or fines, new ADA elevator in building
EDISON ELEMENTARY- School and garden are accessible- paved around playground and many paths through garden that allow universal access.

What are the primary goals of school program?

STEELE ELEMENTARY-Garden component- originally started with goals to show kids where food comes from, now it is more oriented towards developing their palettes to be excited about fresh food and bringing garden food into the cafeteria (garden to cafeteria program)- cooking, tasting, gardening

EDISON ELEMENTARY- Community involvement, strengthening ties with Edison neighbors, donating food to the hungry and homeless, teaching science and art, strengthening test scores through hands on learning, teaching about wellness and healthy food choices, eating organics, etc.

Is there room or consideration for expansion of facilities or learning landscape?

STEELE ELEMENTARY- Learning Landscape- New 20x30 greenhouse which will be half growing space and learning lab, otherwise the learning landscape space is maxed out. Building- ADA elevator is new, added cafeteria on 4 years ago but any future additions would be difficult to rationalize due to space limitations. The outdoor space is considered a premium. The school is a registered historic building so there are limits on what you can do.

EDISON ELEMENTARY- There is not much room to expand, other than adding isolated xeriscape beds around the school building.

How often is the learning landscape used?

STEELE ELEMENTARY
Active areas used daily during recess, Kaleidoscope after school daycare and science classes use outer space elements.
Garden classes are season dependent:
Feb-March: 2 indoor classes each for K, 1 and 2 (Seedling classes)
April-May: 1-2 outside classes for all classrooms (Garden prep and planting)
June-Aug: garden maintenance with family support
Fall: 2-3 classes for all rooms (Harvest, Youth Farmers Markets, Garden To Cafeteria, Garden cleanup, and Composting)
Garden classes carry through life cycle that children see as they progress in grade levels"
EDISON ELEMENTARY- 2-4 hours per week, depending

Are there organizations or groups that coordinate related events/activities in the learning landscape?

STEELE ELEMENTARY- Slow Food Denver(main organization coordination with school), Youth Farmers Market, Garden to Cafeteria Program (through DPS)- 14 schools from around the district sold 1200 lbs of produce in 8 weeks and made $1500 which will be distributed among the schools. Denver Urban Gardens- community garden group in town that partners with school, Girl Scouts- adopted herb garden, Boy Scouts, Kaleidoscope after school daycare program, PTSA fundraisers, Carnival, Neighborhood house tour that starts in the school with a BBQ and plant sale

EDISON ELEMENTARY- The student Green Team has twice monthly garden activities that meet before school. "We also work with Denver Urban Gardens, Cooperative Extension and the Boy Scouts." The Green Team is composed of students with 2 teachers and 3-4 parent leaders that are in charge of after school programs and recycling. Connecting Generations is a DUG program that links older volunteers with kids in all of their community gardens.

What community, parent, professionals + student interaction occurs in the learning landscape?

STEELE ELEMENTARY- parents- list of volunteer parents (Parent Garden Group) that Andy can call if he needs help with garden component community- past issues with community and student garden which inhibit coordination between the two groups Denver Urban Gardens would like to see the community garden have more interaction with the school by including their food with the cafeteria contribution weekend use open to all

EDISON ELEMENTARY- There are sometimes hired professionals for after school programs that occur in the garden- poetry to be specific.

Who are the major supporters of the learning landscape?

STEELE ELEMENTARY- parents and teachers- Andy noted the importance for multiple parent leaders to run garden component to ensure continued support over years an throughout grade levels

EDISON ELEMENTARY- DUG, Teachers, adult Green Team members, Garden Committee members and other school officials.

Curriculum Link + Play

What subjects or curriculum elements are taught using the school landscape and how is it used as learning media?

STEELE ELEMENTARY- mix of science and culinary- weather, constellations, astronomy, seed composition, seed optimal growth requirements, seed collection, where seeds are produced on plants, parts of plants, transplanting, parts of plants eaten, insects etc. In Fall a different vegetable is chosen every week and cooking classes are taught. Kids try vegetables raw then cooked with different recipes from around the world. Food pyramid and health are also included.

EDISON ELEMENTARY- DUG gave suggested curriculum to the school with the designed landscape that is tied to state curriculum (reading, writing, math and science). But, the teachers mostly come up with their own activities. DUG curriculum does not directly correspond with the class curriculum. It is a new school goal to find a better link with the curriculum and garden through 'backward design'. "We want to learn where the learning is happening at certain grade levels." Kelly's art standards are vague so she has open opportunities for activities and makes up her own.

Are there any specific publications used in association with the landscape as learning media?

STEELE ELEMENTARY- garden component- kidgardening.com, but generally thinks of his own experiences for teaching and repeats lessons that are most effective. A lot of other teachers in the district are putting lesson plans in a book that are focused on Colorado centric and climate compatible activities. "It is a struggle to find tasting and cooking components for classes, one of the Slow Food Denver missions is to get kids to try more fresh foods." Denver Urban Gardens Curriculum, DPS Science and Writing Curriculum Guides

What is grown in the learning landscape?

STEELE ELEMENTARY- native planting, turf grass, garden: vegetables, 12 fruit trees (plums, peaches, apples, pears, etc.), raspberry and strawberry patches, herbs

EDISON ELEMENTARY- community plot plants are family dependent but flowers, vegetables and some fruits are grown for the school salad bar. Sunflowers are grown and the kids harvest the seeds. There is a bed specifically for salsa where the kids make their own salsa with The Green Team at before-school meetings. Once pasta salad was made from things in the garden. Tomatoes, cucumbers, zucchini, strawberries, peppers and herbs are grown just to name a few.

How is landscape used after its life cycle has completed or after its purpose has expended?

STEELE ELEMENTARY- garden component- Kids see the all stages of plant life cycle as they progress through the grade levels. Landscape purpose is continuous throughout the year.

EDISON ELEMENTARY-The Green Team is in charge of putting the garden to bed and the community volunteers help the students with maintenance.

Is the landscape dynamic and allowed to change as curriculum is adapted and changed?

STEELE ELEMENTARY- garden component- Andy changes garden design around a bit for change for change of scenery

EDISON ELEMENTARY- Things could be added, curriculum link could be stronger and more developed. There is a lot of potential for change and improvement.

Is your learning landscape active/open all year? Breaks/Holidays/Summer?

STEELE ELEMENTARY- All year-schoolyard has typical fences but entrances are always open.

EDISON ELEMENTARY- Active during spring, summer and fall. Not much activity goes on in winter except some garden activities such as making seed balls, seed collages and starting seedlings occurs indoors. Schoolyard is open at all times to the neighborhood for the garden and playground equipment. We have fences with open gates.

Funding

Did the school learning landscape receive start-up funding? How much and from what type of organizations or groups?

STEELE ELEMENTARY- The school's learning landscape was funded by bonds that were submitted to voters. The most recent bond sent out to voters was $450 million for school improvements in 2006 that included $25 million for 33 learning landscape projects, Steele Elementary being one of them. Voters are generous. $450,000 was provided for Steele. Lois Brink (head of UCD program) works with DPS bond writers. Currently UCD, Slow Food Denver and DUG are working on a large grant with the National Science Foundation that will be used to train teachers in science programs at ten schools. They will be trained to use the garden as part of their science curriculum. If the grant is received, SFD will follow up with applying for a larger grant that would apply to the rest of the district. PTA fundraising does some fundraising.
EDISON ELEMENTARY- Green Up Our School Grants, Denver Urban Gardens grants and donations from Chipotle fundraisers. Cost was approximately $3,000-5,000.

How much does the learning landscape cost annually to maintain, not including staff salaries?

STEELE ELEMENTARY- Garden component- Budget is $2-3,000 provided by fund raising efforts by Slow Food Denver and school PTSA. The rest of the landscape is an annual cost for the facilities managers of the school. DPS hires outside companies to mow the lawn areas. "We allocate a minimum of $700 per year for compost bins, tools, etc. Many plants are donated by local nurseries and we propagate our own seeds." DPS and DUG fund the maintenance efforts as well as the $35 gardeners fee.

Maintenance

Who provides maintenance? What are their roles?

STEELE ELEMENTARY- DPS hires outside companies to mow lawn areas, facilities managers maintain learning landscape except for garden of which Andy is major care taker. Earth Day in April- kids rake leaves in schoolyard for composting guided by the PE teacher and Andy. Older kids help break down the garden and get it ready for winter in November.
EDISON ELEMENTARY- The garden community group, Denver Urban Gardens and DPS turns off irrigation pipes, clear plots, compost, prune trees and clear walkways.

What maintenance occurs during the summer?

STEELE ELEMENTARY- Learning landscape has typical maintenance as discussed above. Turf play field is 'revived' after year of wear. Garden component- up to parent garden group. Group may decide to split up the months for maintenance or include church group or other summer programs. Someone should be there to provide maintenance at least every other day. Andy hires kids through the PTA for $25- families and kids maintain and harvest (3 weekdays and 1 weekend day over two week period). He will also provide training and classes upon request. It is an opportunity for families to contribute to the garden, gain garden experience if they do not have one at home, a money maker for kids and an educational opportunity.

EDISON ELEMENTARY- Custodial staff works half days in the summer and are in charge of the school grounds. Community garden maintenance is from the community volunteers. A lot of students identify with their family's garden plot and often make a point to point it out and acknowledge it.

Is there an emphasis on organics?

STEELE ELEMENTARY- Garden component- Gardening Amendments are organic and natural-a lot of composting (stipulation of health department) - Andy highly discourages use of pesticides and fertilizers

EDISON ELEMENTARY- Yes, not a huge discussion but I know that students talk about no pesticides.

If the learning landscape could be different, what would the differences be?

STEELE ELEMENTARY- The Parking lot islands tend to be weedy in summer and could be planted nicer. The parking lot watering system is inefficient. and the building's east side perennials need attention.

EDISON ELEMENTARY- It needs more shade and maybe more public art. (Art classes are working on adding art to the garden) The garden was designed with themes that are not effectively used so more sensory and tactile experiences that take advantage of them. Major effort to bring public and student art in for the garden- Student projects include gourds and stepping stones. DUG loaned the school painted murals to hang on the fences until the students can replace them with their own.

What are the maintenance challenges?

STEELE ELEMENTARY- Garden component and parking lot islands- Water issues- would like to work towards a drip system (instead of current broadcast system) that is more efficient when budget allows.

EDISON ELEMENTARY-Litter and plant theft.

Reflection

How well are the goals set by the school learning landscape met?

STEELE ELEMENTARY- Very well.

EDISON ELEMENTARY- The garden community group has meetings regularly and parent volunteers meet with teachers and principals about curriculum. More public art and stronger link to curriculum as mentioned above, also use of the original planned theme gardens.

Is there current assessment of the program?

STEELE ELEMENTARY- Garden component- First full year of data collection started this year provided by garden leaders. It consists of a garden book that records people using the garden and hours spent in the garden. Info will be put into a spreadsheet. The ultimate goal is to show the district what impact the volunteers are having in the garden in order to put teachers into paid positions in association with the garden. EDISON ELEMENTARY- Kelly has observed that children who are exposed to using nature as inspiration for art will go back to it time and again throughout their educational career.

What could the learning landscape improve on?

STEELE ELEMENTARY- Andy would like to see an increase in participation for Parent Garden Group. “It is easier to do things myself instead of train others, but this has not fostered parent participation. It is now difficult to get others included.” Other schools have 4-6 parents (older families transition out as students get older). “I would encourage more than one leader for a successful garden.” garden welcoming- teachers don’t feel free to use the garden as would be hoped- they feel like they need permission to use the landscape core subjects leave little room for experimentation and outside use of space for classroom activities outside classroom management- teachers are nervous about teaching outdoors- “My theory is kids leave the building for two reasons, home or recess, they lose memory of the classroom and get wild and carefree.” Andy tries to combat this by insisting teachers are a part of the garden classes (it also helps with student behavior)
EDISON ELEMENTARY- communication, collecting volunteers to make classroom programs happen and tying the garden into specific curriculum.

Is the learning landscape a major appeal for parents interested in their child attending the school?

STEELE ELEMENTARY- The DPS is based on a choice system. There is priority for neighborhood children, but kids can choice into another school if there is room. Until this year there was space for outside families. Many families chose Steel in large part due to the garden component. Steele is now at capacity for neighborhood kids.

EDISON ELEMENTARY- yes, but it is not on our website and it should be. It is relatively new, so this will probably happen in the future.

What are pressures on the schoolyard?
STEELE ELEMENTARY- One of the smallest facilities in the district and rare with the building being located in the middle of the property. 450 kids have small sports field. By May the grass is pretty tired. Kindergarten playground is small for three classes.

EDISON ELEMENTARY- green team -kids make up the team while Kelly and another teacher are on staff along with 3-4 parents of the kids and a few DUG members. 4th grade is the BIG grade and draws the most ambassadors for the garden. Older kids don’t have as much of an interest. The younger ones don’t have a very big voice and I would like to see them have more of an opportunity to into the garden without teacher input.

Why is the learning landscape not more advertised/publicized?

STEELE ELEMENTARY- Seed to Table Program is on website but learning landscape program is 5 years old, so it is not new anymore.

EDISON ELEMENTARY- it is in the newspaper a lot and hopefully it will be better publicized on the school website in the near future.

appendix e

literature review

"Nature doesn't have a design problem. People do," (McDonough and Braungart 2002, 16).

Major Sources

Beyond Ecophobia: Reclaiming the Heart in Nature Education. David Sobel 2005.

Last child in the woods: Saving our Children from Nature-Deficit Disorder. Richard Louv 2008

The Third Teacher: 79 Ways you can use Design to Transform Teaching and Learning. OWP/P Cannot Design, VS Furniture and Bruce Mau Design, 2010

2008 Bond Project: Learning Landscapes District-Wide Schoolyard Redevelopment. Cate Townley 2008.

Ecology and Landscape as Agents of Creativity. James Corner 1997.

Scales of Undecidability, In Case: Downsview Park Toronto. Anita Berrizbeitia 2001.

Sustaining Beauty -The Performance of Appearance: A Manifesto in Three Parts. Elizabeth Meyer 2008.

Transforming Inner-City School Grounds: Lessons from Learning Landscapes. Lois Brink and Bambi Yost 2004.

Big Ideas: Linking Food, Culture, Health and the Environment. Center for Ecoliteracy and Michael Pollan 2008.

Smart by Nature: Schooling for Sustainability. Michael K. Stone and Zenobia Barlow 2009.

Eidetic Operations and New Landscapes in Recovering Landscape: Essays in Contemporary Landscape Architecture. James Corner 1999.

Reviews

Beyond Ecophobia: Reclaiming the Heart in Nature Education. (David Sobel 2005).

Causes of environmental neglect are rooted in our education systems. Educational systems lack a real sense of community life and connection to the natural world. Community should be thought of as a web of community interaction between people and nature. Education should be a journey of discovery that creates a bond between children and nature. If children are healthy educationally, physically, emotionally and psychologically they are more capable of dealing with problems throughout life. These foundations can be formed by creating roots in ecological relationships formed during the school years that are focused on place rather than world perspectives because it invokes ownership, stewardship of the land and empowerment through environmental action.

Typical stages of environmental development for children:
4-7 Becoming the animals and plants
8-11 discover and explore
12-15 service and action.

"When empathy and exploration are supported at the appropriate, critical periods in children's development, connectedness with the earth can serve as a wellspring for social action," (Sobel 33).

According to Gilliam and Lane-Zucker, "Starting on the student's home ground, where family, culture, and natural history resonate in a personal, grounded manner, this education requires that students leave the confines of the classroom. Then, by blending scientific research, artistic response, and frequent interactions with a variety of members of the community- from conservation biologists, restoration ecologists, and others working at the grassroots level, to local historians, storytellers, artists, and town elders- the students begin to learn how to read the world in an authentic, integrated way," (Sobel Vi).

Last child in the woods: Saving our Children from Nature-Deficit Disorder. (Richard Louv 2008).

- Importance for child interaction with nature
- Disorders of children counteracted by nature
- Healthy development for children
- Transforming school environment and outdoor classrooms
- Sustainable future and environmental stewardship
- Multi-sensory and hands-on experience

"The way people interact with nature as a child directly affects their attitude and appreciation for it as an adult. How the young respond to nature, and how they raise their own children, will shape the configurations and conditions of our cities, homes and daily lives," (Louv 3).

"Nature-deficit disorder describes the human costs of alienation from nature, among them: diminished use of the senses, attention difficulties and higher rates of physical and emotional illnesses," (Louv 36).

"Multi-sensory experiences in nature," wrote Robin Moore, "help to build the cognitive constructs necessary for sustained intellectual development and stimulate imagination," (Louv 87).

The Third Teacher: 79 Ways you can use Design to Transform Teaching and Learning. (OWP/P Cannot Design, VS Furniture and Bruce Mau Design 2010).

- Linking play with curriculum, social and cognitive skills
- Using ecological design to provoke sustainability through schools and community
- Insufficient learning facilities lack the ability to address varied learning styles
- Multi-sensory and hands-on learning
- Proper growth and development levels for children
- Case studies of exemplary learning environments

"Ecological Design involves the calibration of human intentions with the knowledge of how the world works as a physical system and the use of that knowledge to inform and discipline our intentions," (OWP/P Architects, et al. 15).

According to David Orr, "All education is environmental education. By what is included or excluded we teach students that they are part of or apart from the natural world," OWP/P Architects 137).

"While timing and the rate of development may vary," according to beyondaccess.org, "all children need to develop in five crucial areas for proper growth: social/emotional, intellectual, sensory, perceptual/motor, and physical. Play environments must be powerful enough to sustain the child's interest and motivation without constant motivational and directional assistance from an adult," (OWP/P Architects 204).

2008 Bond Project: Learning Landscapes District-Wide Schoolyard Redevelopment. (Cate Townley 2008).

A bond proposal written for all 98 elementary schools in the Denver Public School System discusses the components of a learning landscape as well as the major benefits for the program such as engagement in environmental stewardship, community engagement, active outdoor learning and outdoor art projects. Partners include Denver Public Schools, Denver Urban Gardens, Slow Food, Colorado Organic Producers Association and Denver Parks and Recreation.

Project Aims:

- Encourage each elementary school to form Learning Landscape Teams comprised of school staff, students and community members committed to sustaining the Learning Landscape schoolyard.
- Promote civic engagement by inviting community members and students to participate in the design, development of outdoor art, and planting of Learning Landscapes at volunteer builds.
- Promote program sustainability by develop site-specific resources for educators and community members on educational elements unique to each Learning Landscape Schoolyard.
- Develop a sustainable maintenance plan for each Learning Landscape Schoolyard.
- Support the City of Denver Playground Master plan in providing a network of opportunities for play and child development throughout the Denver area.

Ecology and Landscape as Agents of Creativity. (James Corner 1997).

Transformation of culture will occur by setting up frameworks and hybrid relationships with ecology and people in a way that orients culture towards more sustainable means. Landscape should be creative and invoke a new dialog and language between people and nature. He discusses how to 'unsay' or to imagine something in a language all its own, creating new identities and seeing beyond what we are told we see. Examples of reframing, hybridizing and juxtapositioning relationships include poetry, surrealism, Rem Koolhaas and collage techniques.

"Similarities between ecology and creative transmutation are indicative of an alternative kind of landscape architecture, one in which calcified conventions about how people live and relate to land, nature, and place are challenged and the multivariate wonders of life are once again released through invention," (Corner 100).

"Because for thousands of years we have been looking at the world with moral, aesthetic, and religious claims," writes Nietzche, "with blind inclination, passion, or fear, and have indulged ourselves in the bad habits of illogical thought, this world has gradually become so strangely colorful, frightful, profound, soulful; it has acquired color but we have been the painters: the human intellect allowed appearances to appear, and projected its mistaken conceptions onto things," (Corner 84).

"Culture evolves through metaphor and the release of more edifying relationships between things. Poetic transfiguration enables an unfolding of things previously unforeseen, raising people to a perception of the wonderful and the infinite. The aim is one of ever-increasing wholeness, richness, and fullness of differentiation and subjectivity," (Corner 99).

Scales of Undecidability, In Case: Downsview Park Toronto. (Anita Berrizbeitia 2001)

Flexibility is addressed holistically as a design framework that allows adaptation of site as program changes. Berrizbeitia discusses different design proposals for Downsview Park that address a program focused on flexibility. Brown and Storey provide a link between community and park through 'grammar strings' that allow for different uses and durations of interaction. Corner and Allen's scheme focuses on modes of constructing social and environmental relationships by dissolving conceptual and physical boundaries. For example, trace elements from the history of the site connect past and present although they may have different uses. Berrizbeitia discusses 'scales of undecidability' versus 'flexibility' as a means for precision of design form and flexible program. Time and space must be addressed as a [park] must allow for progress, chance and juxtaposition that will activate spaces and promise unknown possibilities (Berrizbeitia 124-125).

"Dissolution of conceptual boundaries between park and city will assure the park's survival as a socially relevant place, its programs in an endless process of self-renewal, as new cultural practices and new subjectivities emerge. The relationship park/environment has now become opportunities to sustain the environmental viability and the cultural relevance of the park," (Berrizbeitia 120).

"Landscape's capacity for precision of form notwithstanding flexibility of program- for the precisely open rather than vaguely loose," (Berrizbeitia 124).

Sustaining Beauty - the Performance of Appearance: A Manifesto in Three Parts. (Elizabeth Meyer 2008).

Sustainability is addressed through ecological health, social justice and economic prosperity but should also address aesthetics. Aesthetics contribute to cultural habits of people, recognizing that in order for a landscape to be sustainable, it must be cared for by those who realize how their decisions affect the environment. Various public attitudes towards sustainability are categorized as well as the role of designers play in shifting their consciousness from 'ego-centric to bio-centric' perspectives. "Sustainable landscape design must do more than function or perform ecologically; it must perform socially and culturally," (Meyer 16).

Landscape should be a creative hybrid that expresses different combinations of human uses while conserving ecosystems, revealing site processes, regenerating ecological systems and remediating sites through design as mentioned by Meyer.

Transforming Inner-City School Grounds: Lessons from Learning Landscapes. (Lois Brink and Bambi Yost 2004).

The history, goals and components of the Learning Landscapes of University of Colorado: Denver is specifically addressed. 1992 marked the first Learning Landscape project when a group of parents, elementary school students, school staff and faculty, neighbors, local business owners and landscape architecture graduate students collaborated to renovate the landscape of Browmwell Elementary in Denver, Colorado. The typical Denver school has issues of safety, inadequate play equipment, aging infrastructure and lack of maintenance. Learning Landscapes aim to serve two or more of the following objectives:

1. Provide participatory landscapes that support outdoor learning in tandem with academic and physical education and offer socialization tools for school-age children.
2. Create a multi-generational space for outdoor play opportunities for both students and the community.
3. Create an aesthetically pleasing focal point for the community.

Big Ideas: Linking Food, Culture, Health, and the Environment. (Center for Ecoliteracy and Michael Pollan 2008).

Big Ideas refers to the conceptual framework that is used for an integrated curriculum linking food, culture, health and the environment to help schools and communities examine the health and environmental impacts of food choices (Center for Ecoliteracy 1).

"What we choose to put on our plate- both as individuals and as a society- has far reaching effects, (Center for Ecoliteracy 1)." To make informed choices about our food means considering:

- Where food comes from and how it is produced
- How culture shapes our choices and behavior
- Relationships between food and health
- Links between food and environment

Understanding the current process of which we get our food including many people, a multipart transportation system and different technologies helps us understand the effect our food choices have on our environment, health and our society (Center for Ecoliteracy 59). If the process was simplified food would travel less distances, be fresher with less preservatives, we would know exactly where it came from and would be more inclined to make, prepare and grow the food ourselves.

Michael Pollan suggests "If we all understood that how and what we eat determines to a great extent the use we make of the world and what is to become of it, we would eat with a fuller consciousness of all that is at stake, (Center for Ecoliteracy xi)."

Smart by Nature: Schooling for Sustainability. (Michael K. Stone and Zenobia Barlow 2009).

Smart by Nature discusses the varied environmental and personal health problems the next generations of children will be faced with that are the result of the past generations choices regarding the environment. In order to battle the problems that are out of their control they will be required to become leaders and citizens who can think ecologically, understand the interconnectedness of human and natural systems, and have the will, ability, and courage to act (Stone and Barlow 1). They

will have to discover new ways to live on a planet with finite resources by understanding the many food webs and life and energy cycles in order to make informed decisions and creative technological advancements that keep community symbiosis in mind.

Smart by Nature movement encompasses ideas from other movements that are aimed towards reshaping the relationship between human societies and nature, including Green Schools, Eco-Schools and High Performance Schools. Smart by Nature focuses on long term community resiliency and what is good for current schools. "Students who learn nature's principles in gardens and serve their communities through civic participation become more engaged in their studies and score better in diverse subjects, including science, reading and writing, and independent thinking," (Stone and Barlow 3). It is grounded many educational fields, for all education is environmental education. The movement relies on teaching competencies of the head, heart, hands and spirit through methods that reveal multiple perspectives of relationships, connectedness and context (Stone and Barlow 3).

Sustainability should be flexible and adaptive, drawing energy from its environment, and appreciates that life has more to reveal than human cleverness has yet discovered. It teaches its children to pay attention to the world around them, to respect what they cannot control, and to embrace the creativity with which life sustains itself (Stone and Barlow 2).

"The campus, the life of the school community, and that community's relationships with the larger communities in which it is embedded are not just the context for curriculum. Students learn from what the school serves for lunch, how it uses resources and manages waste, who is included in its decisions, how it relates to the surrounding community," (Stone and Barlow 4).

Eidetic Operations and New Landscapes in Recovering Landscape: Essays in Contemporary Landscape Architecture. (James Corner 1999).

People view landscape in two ways: as "insiders" and "outsiders". Examples of outsiders are designers, tourists and planners who look at landscape objectively. The insider is one who experiences the landscape in a general state of distraction and through regular habit and use (Corner 155). Corner suggests that Landscape Architects (as outsiders) play a vital role in transforming the ideals of insiders by using landscape as a tool for generating new perspectives and revelations. "The future of landscape as a culturally significant practice is dependent on the capacity of its inventors to image the world in new ways and to body forth those images in richly phenomenal and efficacious terms," (Corner 167).

Corner criticizes landscapes for they are often representational and are the result of past idealistic impulses that distract those who experience them from the problems and inequities of the present (Corner 157). Representational landscapes deny people of having a deeper understanding of natural processes and their role as a culture within them. "To continue to construe the practice of landscape as the creation of seductive and beautiful settings is only to forestall confronting the problems of contemporary life," (Corner 158). Landscapes should function as a hybrid between representation and instrumentation to blend cultural aesthetics and exposed realities that open social convention to critique, reflection and alternative possibilities (Corner 164). Frameworks will allow a maximum range of interactions among the programmatic parts and reveal the results of their interaction over time.

Corner emphasizes the importance of the creative process and encourages exploration of material experimentation and representation, for example mapping, montaging, diagramming, sectioning and drawing. "If landscape architects construct ideas, then the role of imaging in idea formation and projection needs to be better articulated than simply by opposing 'artistic' renderings to 'technical' working documents. Perhaps a key to understanding eidetic imaging in design is found in a kind of thinking that is neither instrumental nor representational but simultaneously both," (Corner 164).
Corner suggests many methods of exploration including datascaping, montage, layering and separating as methods of exploring with the creative process and adaptations of representation. Datascaping is a way of planning through organizing data that frames issues in different ways and formulates conditions in ways that produce novel and inventive solutions (Corner 165). Any mapping technique that arranges parts brought together into productive relationships as agents are successful techniques (Corner 166).

appendix f

adapted CHPS scorecard

The aim for the design is to construct enabling relationships between the freedoms of life in terms of change and the presesnce of formal coherency and structural/material precision, (adapted from Corner 1997).

Reading the Scorecard

Red text throughout the scorecard indicates application of Hybrid Learning Landscape Framework and proposed adaptation of the CHPS scorecard for the CHPS development category *New Building on an Existing Campus.* The target column compares the existing point goals set by MontClair Elementary's proposed site improvements set for construction in fall of 2011 with the targeted score after Hybrid Learning Landscape Framework is applied to the site.

CHPS Scorecard Adaptations Summary

Leadership, Education and Innovation
(existing): 1 prerequisite, 13 possible point (proposed): 1 prerequisite, 36 possible points
Sustainable Sites
(e): 2 prerequisites, 14 possible points (p): 2 prerequisites, 17 possible points
Water
(e): 1 prerequisite, 9 possible points (p): 1 prerequisite, 11 possible points
Energy
(e): 2 prerequisites, 29 possible points (p): 2 prerequisites, 30 possible points
Climate
(e): 10 possible points (p): 12 possible points
Materials and Waste Management
(e): 2 prerequisites, 18 possible points (p): no change
Indoor Environmental Quality
(e): 4 prerequisites, 25 possible points (p): no change
Continued Verification
(e): n/a (p): 11 possible points

total
(e): 66 credits, 118 possible points (p): 83 credits, 160 points

CHPS section	goal	(e) (p)credit number		title	(e) (p) possible points		(e) (p) summary		(e)(p) target		narrative details
Major Modernizations or a New Building on an Existing Campus- (e): 66 credits, 118 points (p): 83 credits, 160 points											
Leadership, Education and Innovation (e): 1 prerequisite, 13 points possible (p): 1 prerequisite, 36 points possilble											
Leadership	Encourage leadership and high performance planning on the project and district level.	LEI1.1		District Level Commitment	1-2		District must maintain CHPS membership and pass a board-level resolution that mandates compliance with CHPS. Two point if resolution incorporates CHPS Maintanence and Operations program.		1	1	OUSD-- CHPS Board Resolution passed in 2007- on file with CHPS.
		LEI1.2		Integrated Design	1-2		Implement at least two integrated design team workshops to discuss high performance goals. Workshops must be conducted at SD and CD phases of project.		1	1	OUSD--workshop #1 , Jan 11, 2007- Plan date for workshop #2 mid-DD.
School as Learning Tool	For the school site to become a hands-on teaching tool for students, teachers, staff, and the community to learn about the benefits of high performance design and the natural resources affected by the various features.	LEI2.0		Educational Display	Req.		Provide a permanent educational display in prominent school location that describes the high performance features that are part of the school's design.		x	x	Arch.--Designate Ed Display Location
		LEI2.1		Demonstration Areas	1	1-5	LEI2.1.1: Create demonstration areas for three out of the five major high performance categories of the CHPS Criteria: sustainable sites, water, energy, materials, and indoor environmental quality. LEI2.1.2: Within these demonstration sites at least one feature of a high performance category must be showcased. Each demonstration area must explain how the high performance features works, its environmental and economic benefits, and how it exemplifies a holistic and integrated approach to sustainable design.	Create a demonstration area for each of the five major high performance categories of CHPS Criteria: sustainable sites, water, energy, materials, and indoor environmental quality.	1	5	Arch.--Target three demonstration areas
			LEI2.2	Educational Signage		1-5	provide educational signage for each demonstration area that explains how the high performance feature works, its environmental and economic benefits, and how it exemplifies a holistic and integrated approach to environmentally resillient design.			5	
			LEI2.3	Curriculum-based learning tool		1-10	provide an outdoor element that acts as a curriculum-based learning tool for each of the 9 core curriculum subjects, addressing multiple learning styles and is usable by all grade levels. Core subjects include Health, Physical Education, World Language, School Library, English, Math, History-Social Science, Science and Visual-Performing Arts (+1 for locally based activities)		0	10	

Table 8.01
Adapted CHPS Scorecard: Incorporating Hybrid Learning Landscape Framework
By Author 2011, adapted from CHPS 2009

CHPS section	goal	(e) (p)credit number		title	(e) (p) possible points		(e) (p) summary	(e)(p) target		narrative details
		SS4.3	LEI2.4	School Garden		1	Provide infrastructure for a school garden with size dependent on student capacity. Maintain portion for universal access.	1	1	New garden areas planned, at greater than 8 s.f per student. Lower hill side native garden included in calculation
			LEI2.5	Outdoor Classroom Space		1-2	LEI2.5.1: Provide an outdoor classroom space that is large enough to accommodate the average classroom size and associated faculty. Provide effective acoustic protection from outside sound sources. LEI2.5.2: Outdoor classroom space provided to be open for community use during designated community access hours, ie. evenings and weekends.		2	
			LEI2.6	Open Schoolyard		1	Maintain an open schoolyard for community access during after school hours, weekends and holidays	0	1	
Innovation	Encourage innovation in high performance school design.	LEI3.1		Innovation	1-4		Implment new technologies or strategies that further high performance goals.	1	4	outdoor classroom, native plant palette, outdoor eating area, curriculum-based learning elements, Walking-Schoolbus Program, Co2 Emission monitoring, etc. (LEI3.1.1 and LEI3.1.2)
		LEI3.2		Design for Adaptability, Durability and Disassembly	2-4		Provide a plan and implement strategies that promote material conservation and ease of disassembly.		2	2 points and minimum requirement (LEI3.2.1)

CHPS section	goal	(e) (p)credit number		title	(e) (p) possible points		(e) (p) summary	(e)(p) target		narrative details
Sustainable Sites (e): 2 prerequisites, 14 possible points (p): 2 prerequisites, 17 possible points										
site selection	Choose sites that protect students and staff from outdoor pollution, minimally impact the environment and promote community integration. Sustainable sites are those that channel development to centrally located areas, utilize existing infrastructure, protect green fields and preserve natural habitat and resources.	SS1.0		Code Compliance	Req.		Comply with all requirements of Title 5 and CA Education Code and Public Resource Code sections specified.	x	x	OUSD/arch--N.A.- New addition on Existing school site
		SS1.1		Environmentally Sensitive Land	1		No development on sites that are: prime agricultural land, in flood zone, habitat for endangered species,greenfield, near a wetland or considered parkland.	1	1	Arch.--N.A- New addition on Existing school site
		SS1.2		Central Location	1		Create centrally located sites within which 50% of students are located within minimum distances of the school.	1	1	Arch.--OUSD has boundary map. Document with principal.
		SS1.3		Joint-Use of Facilities	1	2	Design at least one space for "joint-use" and provide specified security measures.	1	2	Arch.- enlarged multipurpose room and bathroom arrangement, joint use schoolyard and program elements with community
		SS1.4		Joint-Use of Parks	1		Share park or recreation space	0	1	Maybe--OUSD/Arch.--Initial check of 08 draft joint-use agreement does NOT list Montclair -ask Tadashi
		SS1.5		Reduced Footprint	1		reduce the building footprint	1	1	Arch.--ratio 1:6
Transportation	Decrease pollution and land development impacts from vehicles.	SS2.1		Public Transportation	1		locate near public transportation	1	1	Arch. Document on Site Plan.
		SS2.2		Human Powered Transportation	1		Provide bike, scooter or skateboard racks, bike lanes and trails for (a percentage) of the school population.	0	1	provide bike lanes, trail linkages and sidewalks that extend from school entrance to end of school zone (SS2.2.1). Provide bicycle racks for 15% of elementary students.
		SS2.3		Minimize Parking	1		Minimize parking lot and create preferred parking for carpools.	1	1	Arch.--No parking spaces added to project. Reduced asphalt. Provide preferred parking totalling 5% of total parking spaces for carpools, vanpools or low-emission vehicles (SS2.3.1). Size parking capacity not to exceed 2.25 spaces per classroom.
			SS2.4	Walking-School Bus		1	Implement a Walking School Bus Plan for children before and after school	0	1	

CHPS section	goal	(e) (p)credit number		title	(e) (p) possible points		(e) (p) summary	(e)(p) target		narrative details
Stormwater Management	Manage stormwater during and after construction to control erosion, sediment and other pollutants as well as volume and velocity of runoff, reducing the negative impacts to water and air quality.	SS3.0		Construction Site Runoff Control	Req.		Control erosion and sedimentation to reduce negative impacts on water and air quality.	x	x	Civil/G.C.--Will be addressed in construction documents
		SS3.1		Limit Stormwater Runoff	1		For sites with an existing imperviousness of more than 50%, implement a stormwater management plan that results in a 25% reduction in the rate and quantity of stormwater runoff (SS3.1.1). Design trash storage areas to provide appropriate drainage from adjoining roofs and pavement to divert stormwater runoff around the trash storage areas. The trash container areas must be screened or walled to prevent off-site transport of trash (SS3.1.2).	0	1	
		SS3.2		Treat Stormwater Runoff	1		treat stormwater SS3.2.1 and SS3.2.2	1	1	Civil/ landscape arch. Combination of bioswale, green roof and stormwater mgt. plants along street boundary
Outdoor Surfaces and Spaces	Reduce heat islands to minimize impact on microclimate, and man-made and natural habitat.	SS4.1		Reduce Heat Island Effect with shade	1		Shade (on at least 50% of non-roof) within 5 years on paved surfaces. Use light-colored/hihg-albedo materials for 50% of non-roof paved surfaces. Use open-grid pavement system on at least 50% of the parking lot area.		1	
		SS4.2		Reduce Heat Island Effect with Cool or Green Roof	1		Install cool or green roof.	1	1	Specified for 100% of roof space. 82 SRI standing seam metal roof at classroom wing. Green roof at multipurpose wing. Green roof on proposed classroom building.
		SS4.3		Outdoor Universal Circulation		1	universally accessible	0	1	
		SS4.4		Space for Outdoor Tables with seating		1	provide tables and seating maximum classroom capacity or for designated lunchtime capacity. Maintain access and safety from schoolyard.	0	1	
Outdoor Lighting	Eliminate light trespass from the building site and improve night sky access.	SS5.1		Light Pollution Reduction	1		Only provide exterior lighting when it is clearly required for safety and comfort. Design the exterior lighting not to exceed 80% of the lighting power allowed by the California energy efficiency standards in effect at the time of submission of the project to the Division of the State Architect (SS5.1.2) .	1	1	

CHPS section	goal	(e) (p)credit number		title	(e) (p) possible points		(e) (p) summary	(e)(p) target		narrative details
Water (e): 1 prerequisite, 9 possible points (p): 1 prerequisite, 11 possible points										
Outdoor Systems	Limit excess water use for landscaping and ornamentation.	WE1.0		Create Water use Budget	Req.		Establish water use budget and conform to the local water efficient landscpe ordinance.	x	x	Civil/Land. Arch
		WE1.1		Reduce Potable Water for Use for non-recreational Landscaping Areas	1-2		Reduce potable water by 50% or 100%, or do not install permanent irrigation systems for landscaping areas. Install Water Catchment System for supplemental irrigation	1	2	Reduce potable water, natural surface water or groundwater for irrigation of non-recreational landscape areas by an additional 50% (100% total reduction) (WE1.1.2). Install water catchment system for supplemental irrigation or irrigation during dry months.
		WE1.2		Reduce Potable Water for Recreational Area landscaping	1		Reduce potable water by 50% and install soil moisture meters or ET Controllers on recreation field.	0	0	
			WE1.3	Install Native Plantings		1-2	reduce watering needs by planting natives (over 50% native=1pt, 100% native=2pts)		2	
		WE1.3	WE1.4	Irrigation System Testing and Training	1		Create irrigation commissioniong plan, test irrigation sytems and train staff.	1	1	Land. Arch. And School Green Team
Indoor Systems	Maximize water efficiency within buildings to reduce the burden on municipal water supply and wastewater systems.	WE2.1		Reduce Sweage Conveyance from Toilets and Urinals	2		35% reduction in potable water use for sewage conveyance and provide shut-off capabilities for water supply to all urinals and water closets.	2	2	Plumbing Eng.--Determine 5 reduction using HETs, dual flush action and 'pint' urinal
		WE2.2		Reduce Indoor Potable Water Use	1-2		Decrease water use by an additional 20% or 40% after meeting Energy Policy Act of 1992.	1	1	Plumbing Eng.--Decrease use by 20% min.
Water Efficiency	Maximize water efficiency within the campus(indoor and outdoor) to reduce the burden on municipal water supply and wastewater systems.	WE3.1		Water management system	1		Install a water monitoring system to manage usage and reduce consumption.	0	1	install web-based performance monitoring system. Display results on tv screen in educational display area in real time (Data for indoor potable and Outdoor Catchment Tank Water)

CHPS section	goal	(e) (p)credit number		title	(e) (p) possible points		(e) (p) summary	(e)(p) target		narrative details
Energy (e): 2 prerequisites, 29 possible (p): 2 prerequisites, 30 possible points										
Energy Efficiency	Reduce environmental impacts and increased operational costs associated with excessive energy use.	EE1.0		Minimum Energy Performance	Req.		Design building to exceed Title 24-2008 by 15%.	x	x	Mech. Eng.
		EE1.1		Superior Energy Performance	1-15		16% to 44% reduction in total net energy use from Title 24-2008 baseline.	5	5	Mech.eng.--Target 27% min., but discuss stategies to achieve 30% or better than T24 compliance. Considering displacement ventilation? Could be 8 pts.?
		EE1.2		Energy Conservation Interlocks	1		Install interlocks to turn off heating and cooling equipment if doors and windows are open.	0	0	Mech. Eng. Maybe
		EE1.3		Natural Ventilation	1-4		Comply with Title 24, Part 6, 121b for assembly spaces and/or 90% of typical classrooms.	4	4	Mech.eng/arch..--Naturally ventilate 90% of classrooms at minimum; Maybe 1 more pt. if include cafeteria.
		EE1.4		Energy Management Systems	1-2		Install Energy Management System and provide training and manuals for maintenance personnel. Additional point for plug load.	1	1	Mech./Elec.eng.--Install EMS by Alerton per OUSD std. , explore 1 more pt. for plug load monitoring.
Alternative Energy Sources	Reduce environmental impacts and operational costs associated with fossil fuel energy use.		EE2.1	On-Site Renewable Energy		1	provide on-site source for energy that powers some component of the campus	0	1	child play equipment generated energy- powers fans on shade structures above outoor eating area
		EE2.1	EE2.2	On-Site Renewable Energy Monitoring System	1-5		Install web-based performance monitoring system and provide 1-90% of the building's TDV energy use through on-site renewable systems.	0	1	Maybe--Arch./Elec.--NOTE: all new roofs, that are not green roofs, to be designed to maximize potential for solar panels. Space for future inverter and conduit to be provided. Display results on tv screen in educational display area in real time
		EE3.0		Fundamental Commissioning	Req.		Third party or district verification of building systems & training.	x	x	Cx/OUSD--See below also. OUSD to prepare OPR and MEP to provide Basis of Design in response
Commissioning and Training	Verify that fundamental building elements and systems are designed, installed, and calibrated to operate as intended, and provide for the ongoing accountability and optimization of building energy performance over time.	EE3.1		Enhanced Commissioning	1-2		Additional third party or district verification of building systems, training and best practices.	2	2	Cx--OUSD PM to secure Cx provider before DD review to begin Cx scope

CHPS section	goal	(e) (p)credit number		title	(e) (p) possible points		(e) (p) summary	(e)(p) target		narrative details
Climate (e): 10 possible points (p): 12 possbile points										
Greenhouse Gas Emissions Reduction	Encourage school districts to reduce their impact on climate change.	CL1.1		Climate Change Action	1-3		Choose strategies that reduce greenhouse gas emissions and/or measure and report emissions annually.	1	1	Arch.-- 1 pt. min., Arch. To identify & track-points to meet requirement of this credit. Maybe--team may consider pursuing the extra 1 pt. for transportation plan
		CL2.1		Grid Neutral	2		Create a school that produces at least as much electricity as it uses in a year and uses renewable energy strategies.	0	0	
		CL2.2		Zero Net Energy	5		Create a school that produces at least as much electricity as it uses in a year (without using fossil fuel based energy sources produced off-site) anduses renewable energy strategies.	0	0	
			CL2.3	Greenhouse Gas Emission Monitoring		1	Install web-based performance monitoring system and display results on tv screen in educational display area in real time (Data for Car-pool Incentive)	0	1	possible competition with other school districts through use of monitoring system
			CL2.4	Create Wildlife Habitat for native species		1	Create wildlife habitat for native species	0	1	native planting beds, sensory garden and student vegetable garden

CHPS section	goal	(e) (p)credit number		title	(e) (p) possible points		(e) (p) summary	(e)(p) target		narrative details
Materials and Waste Management (e): 2 prerequisites, 18 possible points (p): no change										
Recycling	Reduce the amount of solid waste disposed of in the landfill after the school is built.	ME1.0		Storage and Collection of Recyclables	Req.		Meet local standards for recycling space and facilitate the separation and collection of materials. Provide easily accessible area serving the entire school that are dedicated to the collection and storage of materials for recycling including (at a minimum) paper, cardboard, glass, plastics, metals and landscaping waste. There shall be at least one centralized collection point, and ability for separation of recyclables where waste is disposed of for classrooms and common areas such as cafeteria's, gyms or multi-purpose rooms (ME1.0.P2).	x	x	Arch.
Construction Waste Management	Reduce the amount of construction and demolition waste disposed of in the landfill.	ME2.0		Minimum Construction Site Waste Management	Req.		Recycle, compost and/or salvage at least 50% of non-hazardous construction and demolition debris.	x	x	OUSD?Arch.
		ME2.1		Construction Site Waste Management	1-2		Recycle, compost and/or salvage at least 75% to 90% of non-hazardous construction and demolition	1	1	OUSD/Arch. -- OUSD PM to provide spec section within front end to meet 75% min. C&D diversion
Building Reuse	Extend the life-cycle of existing buildings and materials.	ME3.1		Building Reuse- Structure and Shell	1-2		Reuse 75% to 95% of existing structure and shell.	0	0	
		ME3.2		building Reuse- Interior Non-Structural Elements	1		Use existing on-site non-shell elements in at least 50% of completed building.	0	0	
Sustainable Materials	Increase the use of sustainable materials.	ME4.1		Recycled Content	12		Follow prescriptive or performance approach.	2	2	Arch. Prescreptive Approach
		ME4.2		Rapidly Renewable and Organically Grown Materials	1-2		2.5% of materials are rapidly renewable or specify rapidly renewables for 50% of one of the listed major interior finishes or structural materials. Extra point for using organic materials.	0	0	
		ME4.3		Certified Wood	1		50% of wood must be certified	1	1	Specify certified wood in framing of classroom wing
		ME4.4		Salvaged Materials	1-2		Follow prescriptive or performance approach.	0	1	Salvaged Asphalt
Sustainable Materials- Multi-Attribute	Increase demand for sustainable materials.	ME5.1		Enironmentally Preferable Products	1-2		Use this credit instead of 4.1-4.4. Interior finishes must meet EQ2.2. Earn a one-half point for each certified EPP Product.	0	0	
Sustainable Materials	Increase demand for sustainable materials.	ME6.1		Environmental Performance Reporting	1-4		Choose products that have undergone a life cycle impact assessment by national standards.	0	0	

CHPS section	goal	(e) (p)credit number		title	(e) (p) possible points		(e) (p) summary	(e)(p) target		narrative details
Indoor Environmental Quality (e): 4 prerequisites, 25 possible points (p): no change										
Lighting and Daylighting	Improve student productivity through quality daylighting and electric lighting design. Provide a connection between indoor spaces and the outdoor environment through the introduction of sunlight and views into the occupied areas of the building.	EQ1.1		Daylighting	1-4		Meet minimum requirements and choose one of three options.	4	4	see daylighting report.
		EQ1.2		View Windows	1		Direct line of site glazing for 90% of classrooms, libraries and administration areas and provide view glazing equal to or greater than 7% of the floor	1	1	
		EQ1.2		Electric Lighting	1		Provide high quality and flexible classroom lighting	1	1	Elec Eng..--Review all requirements, identify basic ICLS system/layout (Finelite) Stepped tier dimming first
Indoor Air Quality and Thermal Comfort	Achieve good indoor air quality to protect student and staff health, performance, and attendance.	EQ2.0A		Minimum HVAC and Construction IEQ Requirements	Req.		Establish minimum standards for indoor air quality that includes construction ventilation, building flushout, outside air ventilation and HVAC basic requirements among other things.	x	x	
		EQ2.0B		ASHRAE 55 Thermal Comfort Code Compliance and Moisture Control	Req.		Comply with ASHRAE 55-2007 thermal comfort standard and employ moisture control measures to prevent mold growth.	x	x	
		EQ2.0C		Minimum Filtration	Req.		Use HVAC with MERV 8 or greater rated filters through the HVAC system.	x	x	
		EQ2.1		Enhanced Filtration	1-2		Use HVAC with minimum MERV 11 or 13 rated filters through the HVAC system.	1	1	
		EQ2.2		Low-Emitting materials	1-4		Earn one-half point for each category of lowemitting products used in all classrooms and staff	4	4	
		EQ2.3		Ducted Returns	1		install ducted HVAC returns.	1	1	
		EQ2.4		Thermal Displacement Ventillation	2		Use thermal displacement ventilation in at least 90% of the classrooms.	0	0	
		EQ2.5		Controllability of Systems	1-4		Provide operable windows, dedicated outside air ventilation system and/or separate controls for each classroom.	2	2	
		EQ2.6		Chemical and Pollutant Source Control	1-2		Control dust, segregate pollutant sources and local exhaust in kitchens. Install walk-off mats.	2	2	
		EQ2.7		Mercury Reduction	1		Create inventory of all devices containing mercury and purchase or replace lamps with low mercury	1	1	
Acoustics	Design quiet classrooms in which teachers can speak to the class without straining their voices and students can effectively communicate with each other and learn.	EQ3.0		Minimal Acoustical Performance	Req.		Classrooms must have a maximum (unoccupied) noise level of 45 dBA LAeq, with maximum (unoccupied) reverberation times of 0.6 sec.	x	x	Acoustic eng.--meet min.
		EQ3.1		Improved Acoustical Performance	1 or 3		Classrooms must have a maximum (unoccupied) noise level of 40 or 35 dBA LAeq, with maximum (unoccupied) reverberation times of 0.6 sec.	1	1	Acoustic eng.--meet min. 40 dba in Crs and .6 sec or .7 sec. as applicable to volume of CR.

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Continued Verification (p): 11 possible points										
Record Keeping	Maintain yearly log of CHPS school to improve CHPS program and individual school efficiency		VC1.0	Record Keeping		1-2	Maintain a yearly log of all elements associated with CHPS program including maintenance, events, changes in program elements, issues, funding sources and progress	0	2	
Volunteering	Increase interaction between communiy, nature and students through volunteer activities		VC2.0	Volunteering		1-3	Participate in community volunteering activities that promote a growing relationship between community, students and nature	0	3	
Funding	Continue to receive funding for advancement of high performance school		VC3.0	Funding		1	Receive funding for advancement of CHPS school (i.e. program elements, guest lecturers, facility upgrades)	0	1	
Advertising	Advertise to inform public about CHPS and school		VC4.0	Advertising		1	Advertise the CHPS school and its features in media (newspapers, fliers, tv, radio, etc.)	0	1	
Open Schoolyard	Reorient the school as a local gathering place and park for the community		VC5.0	Open Schoolyard		1	Maintain an open schoolyard for community use after school hours, during weekends and holidays	0	1	
Lectures/Presentations	Maintain a relationship between the community and students for fresh perspectives and long-term relationships.		VC6.0	Lectures/Presentations		1-2	Provide or receive lectures or presentations that promote CHPS schools or enhance community, student and nature relationships	0	2	
Innovation	encourage innovation in high performance schools	LEI3.1 (2)		Innovation	1		Implment new technologies or strategies that further high performance goals.	0	1	